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WAR DEPARTMENT

**SIGNAL CORPS
FIELD MANUAL**



**ORGANIZATIONS AND OPERATIONS
IN THE CORPS, ARMY, THEATER
OF OPERATIONS, AND GHQ**

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SIGNAL CORPS FIELD MANUAL



ORGANIZATIONS AND OPERATIONS IN THE CORPS, ARMY, THEATER OF OPERATIONS, AND GHQ

Prepared under direction of the
Chief Signal Officer



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BY ORDER OF THE SECRETARY OF WAR:

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TABLE OF CONTENTS

	Paragraphs	Page
CHAPTER 1. GENERAL	1-5	1
CHAPTER 2. CORPS.		
Section I. Corps organizations and employ-		
ment.....	6-7	3
II. Signal section.....	8-9	3
III. Signal battalion.....	10-16	4
IV. Signal communication in the		
corps.....	17-36	17
CHAPTER 3. ARMY.		
Section I. Organization	37-38	29
II. Headquarters, army signal service..	39-47	30
III. Signal company, photographic....	48-56	35
IV. Pigeon company.....	57-63	39
V. Radio intelligence company.....	64-86	43
VI. Depot signal company.....	87-94	65
VII. Signal communication in the		
army.....	95-108	72
CHAPTER 4. THEATER OF OPERATIONS AND GHQ.		
Section I. Organization	109-110	81
II. Headquarters, GHQ signal service..	111-120	84
III. Construction battalion.....	121-127	87
IV. Signal laboratory, photographic....	128-134	91
V. GHQ aviation signal service.....	135-146	98
VI. Aircraft warning service.....	147	108
VII. Signal communication in theater		
of operations	148-152	109
INDEX		115

SIGNAL CORPS FIELD MANUAL

ORGANIZATIONS AND OPERATIONS IN THE CORPS, ARMY, THEATER OF OPERATIONS, AND GHQ

(This manual supersedes ch. 3; ch. 4; and secs. IV and V, ch. 5, SCFM, vol. I, November 20, 1931.)

CHAPTER 1

GENERAL

■ **1. PURPOSE.**—The purpose of this manual is to outline briefly the organization and employment of the corps, army, theater of operations, and GHQ, to cover more fully the organization and operations of signal corps units assigned thereto, and to indicate the application of signal communication to tactical operations thereof. It is based upon Field Service Regulations, and is supplementary to FM 24-5 and FM 11-5.

■ **2. ORGANIZATION.**—To provide a guide in the organization, training, and operation of units, the number, composition, and equipment of operating teams have been outlined herein. Exact conformity with current Tables of Organization and Tables of Basic Allowances has been avoided to obviate the necessity for frequent revision. The organization of units and teams is shown wherever practicable by charts. These charts should be used as guides only. In operations, the available personnel and equipment should be so organized into teams as to meet the needs of the situation. Charts for certain teams indicate specialists required to provide a balanced team; otherwise, strengths are not indicated.

■ **3. EQUIPMENT AND SUPPLIES.**—T/BA 11 (Tables of Basic Allowances for Signal Corps) prescribe different allowances for peace and for mobilization (AR 310-60). Proper operation of units and teams described in this manual depends upon the availability at the time of mobilization of the authorized allowance of their equipment and supplies. The

equipment and supplies peculiar to each unit are mentioned only to the extent considered necessary to indicate the operations of that unit.

■ 4. FORMATIONS, DRILLS, AND CEREMONIES.—The formations, drills, and ceremonies of all Signal Corps units covered in this manual are conducted in accordance with FM 22-5.

■ 5. COMMAND OF ATTACHED ORGANIZATIONS.—Portions of any Signal Corps organization of a larger unit may be attached to lower units. Attached units are under the command of the signal officer of the unit to which attached. (See FM 11-5.)

CHAPTER 2

CORPS

	Paragraphs
SECTION I. Corps organization and employment.....	6-7
II. Signal section	8-9
III. Signal battalion.....	10-16
IV. Signal communication in the corps.....	17-36

SECTION I

CORPS ORGANIZATION AND EMPLOYMENT

■ 6. ORGANIZATION.—The corps consists of a corps headquarters (T/O 100-1), corps troops, and two or more divisions. For training purposes, a type corps is used. (See fig. 1.) All the units shown in the figure except corps headquarters and divisions are corps troops.

■ 7. EMPLOYMENT.—*a.* The corps is primarily a tactical unit of execution and maneuver. It has an organization so flexible that it can absorb and utilize reinforcing units, or form part of a higher unit. It can engage on an extended front and can carry on a battle until a decision is reached. In actions of long duration the divisions are relieved by fresh divisions, but the corps remains until a decision is reached or the strategical plan is changed.

b. Except when the corps is acting alone, or when administrative and supply functions have been delegated to it by the army, the corps has administrative and supply functions for the corps troops only. The general principles for the army apply to the corps when the corps is acting alone.

c. For further details, see section IV of this chapter, and FM 100-15.

SECTION II

SIGNAL SECTION

■ 8. ORGANIZATION.—The signal section, corps headquarters (T/O 100-1), consists of the corps signal officer, his executive officer, and enlisted clerical and drafting assistants.

■ 9. OPERATIONS.—As indicated in FM 11-5, the corps signal officer commands, insofar as relates to training and employment, all Signal Corps units assigned or attached to the corps. The corps signal officer maintains close contact with G-2 and G-3 of the corps, with division signal officers, and with the army signal officer. All transportation required by this section is obtained from the corps headquarters company and the corps quartermaster service.

SECTION III

SIGNAL BATTALION

■ 10. COMMAND.—a. A signal battalion, commanded by a lieutenant colonel or a major, is assigned to the corps.

b. The battalion commander is responsible for the administration, discipline, training, and operations of the battalion and, in addition, usually acts as assistant to the corps signal officer.

■ 11. DUTIES.—The duties of the signal battalion assigned to the corps are to install, operate, and maintain the corps signal systems. Signal systems, their agencies, the tactical considerations entering into their establishment, and the responsibilities for their installation, operation, and maintenance are discussed in FM 11-5.

■ 12. EQUIPMENT, SUPPLIES, AND TRANSPORTATION.—The following principal items in sufficient quantities to permit effective operation are authorized for the signal battalion by Table of Basic Allowances for Signal Corps:

a. Drafting and duplicating equipment.

b. Command trucks; cargo trailers; cargo, reconnaissance, and pick-up trucks; and special purpose vehicles, including telephone construction and earth borer trucks of special design.

c. Message center equipment and supplies.

d. Wire and wire construction, operation, and maintenance equipment and supplies, including tools and testing equipment.

e. Radio equipment and supplies.

■ 13. ORGANIZATION.—The signal battalion is composed of a headquarters and headquarters company, a construction company, an operation company, and attached medical personnel. The organization is shown in figure 2.

■ 14. HEADQUARTERS AND HEADQUARTERS COMPANY.—*a. Organization.*—The organization of the headquarters and headquarters company is shown in figure 3.

b. Operations.—(1) *Battalion headquarters.*—The battalion headquarters consists of the battalion commander, the battalion adjutant, the battalion sergeant major, the battalion supply sergeant, clerks, and a draftsman. Either the battalion adjutant or the headquarters company commander ((2) below) is appointed battalion supply officer and battalion transportation officer in addition to other duties. The battalion supply officer usually assists the corps signal officer in the performance of all corps signal supply functions.

(2) *Company headquarters.*—The company headquarters, consisting of the company commander, the first sergeant, mess sergeant, headquarters clerks, cooks, and basic privates, performs the administrative and mess functions of the company.

(3) *Supply.*—The supply platoon, consisting of the supply sergeant and a mechanic, is the supply agency for the company and the battalion.

(4) *Motor transportation.*—The motor transportation platoon consists of a truckmaster and assistants, automobile electrician, mechanics, chauffeurs, and a clerk. This platoon is responsible for the operation, maintenance, and unit repair of all motor vehicles of the entire battalion. (See FM 25-10.) The battalion transportation officer operates the battalion transportation pool directly under the battalion commander. The operation and construction companies of the battalion are not issued transportation but obtain all that is needed from the battalion pool. Chauffeurs of all vehicles are assigned to the motor transportation platoon and operate under the command of the transportation officer unless attached by the battalion commander to the operation or construction companies. The transportation officer must cooperate with the company commanders in the allotment and operation of vehicles.

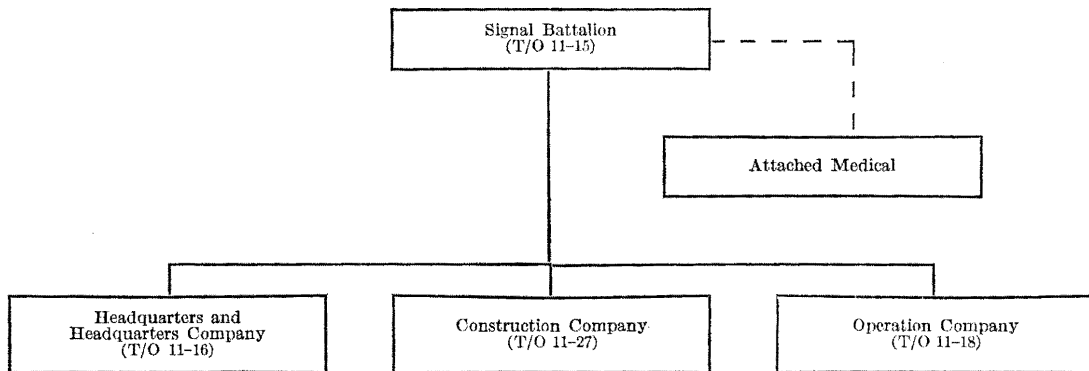


FIGURE 2.—Organization of signal battalion.

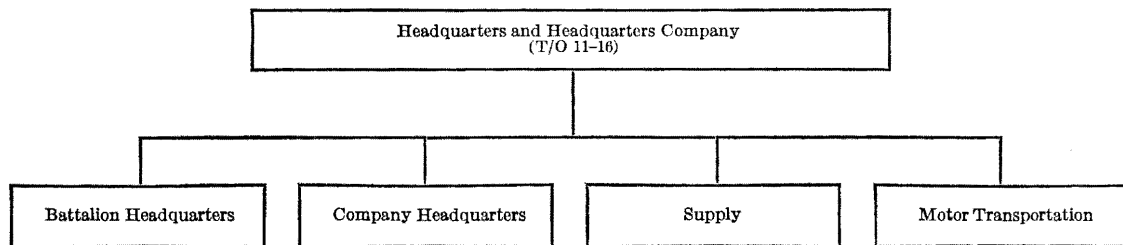


FIGURE 3.—Organization of headquarters and headquarters company, signal battalion.

■ 15. CONSTRUCTION COMPANY.—*a. Organization.*—The organization of a construction company is shown in figure 4.

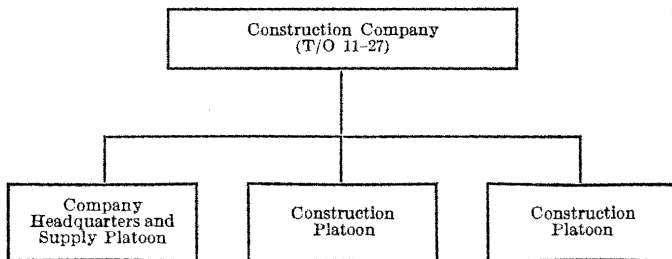


FIGURE 4.—Organization of construction company, signal battalion, and construction battalion.

b. Operations.—(1) *Company headquarters and supply platoon.*—On a functional basis, the company headquarters and supply platoon is divided into a company headquarters section and a supply section.

(a) The company headquarters section consists of the company commander, a lieutenant, the first sergeant, the mess sergeant, clerks, cooks, a draftsman, and basic privates. This section operates the mess of the company, performs its administrative functions, and assists the company commander in assigning missions to the platoons and supervising their operations. The lieutenant is the principal assistant of the company commander and is also the company supply officer.

(b) The supply section consists of the supply sergeant, mechanic, and such clerical and other personnel as are necessary.

(2) *Construction platoons.*—(a) The two construction platoons of the company install and maintain all types of wire circuits, except short local and short trunk circuits, required by the corps. They assist the operation company in the maintenance of short trunk circuits. (See par. 16.) On a functional basis each of the platoons is divided into two sections. No definite organization is prescribed for these sections, but, with the personnel, equipment, and transporta-

tion available, two construction teams can be organized in each section. Hence, eight construction teams can be organized in the company. The organization of teams is made to fit each situation. Platoons are so organized that they may be employed on several construction projects simultaneously or as a unit on one project. To facilitate training and control, platoons, sections, and teams are organized as indicated in figure 5. During operations, the personnel of the teams should be increased or decreased to meet the immediate requirements.

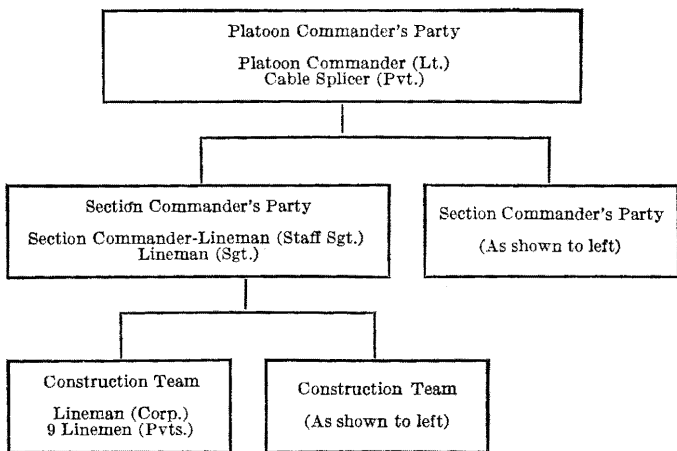


FIGURE 5.—Functional organization, construction platoon.

(b) When the demands for field wire construction are approximately equal to the requirements for pole line construction, the first platoon is employed as the heavy construction platoon and the second platoon as the light construction platoon. The former constructs and maintains the semipermanent and permanent lines including cable lines, and all special telephone construction trucks assigned to the battalion are allotted to this platoon. The second platoon constructs and maintains the field wire lines and

long local circuits. Suitable transportation and field wire-laying equipment should be issued to it.

(c) In very rapidly moving situations it may be necessary to employ both platoons on field wire construction to supplement the existing commercial or military wire lines.

■ 16. OPERATION COMPANY.—*a. Organization.*—The organization of the operation company is shown in figure 6.

b. Operations.—(1) *Administration and supply platoon.*—On a functional basis, the administration and supply platoon is divided into an administration section and a supply section.

(a) The administration section consists of the company commander, the first sergeant, the mess sergeant, clerks, and cooks. This section operates the mess of the company, performs its administrative functions, and assists the company commander in assigning missions to the platoons and supervising their operations.

(b) The supply section consists of the supply sergeant, mechanic, and such clerical and other personnel as are necessary. This section operates the supply agency for the company.

(2) *Message center and messenger platoon.*—(a) *Duties.*—The message center and messenger platoon operates the message centers and with attached personnel furnishes messenger communication. Each member of this platoon is trained to perform all the duties incident to the operation of a message center and to communicate with airplanes by means of panels and dropped and pick-up messages. Since this platoon contains no messengers, it is necessary to attach to this platoon a minimum of eight messengers with their transportation from the corps quartermaster service or other units.

(b) *Teams.*—The organization of teams and reliefs must vary widely to meet each situation. When necessary, clerks are used as local messengers and the number of duty hours for a relief is increased. These expedients are undesirable and in time will impair the efficiency of the platoon. To facilitate training, teams are organized as indicated in figure 7. This organization is based on the assumptions that the operation company is assigned to a corps which operates only

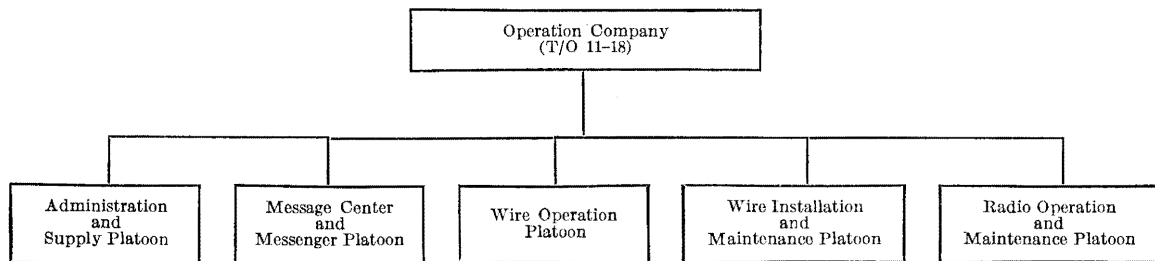


FIGURE 6.—Organization of operation company, signal battalion, and GHQ signal service.

a command post and a rear echelon, that eight messengers are available, that each team provides two reliefs, and that no reserve personnel except that in the relief off duty is available. Under these assumptions, the limited messenger personnel available permits the employment of one local messenger only at each echelon of corps headquarters, and only one special and one scheduled messenger at the command post. Essential and continuing needs, if greater than these, must be met by the attachment of additional personnel.

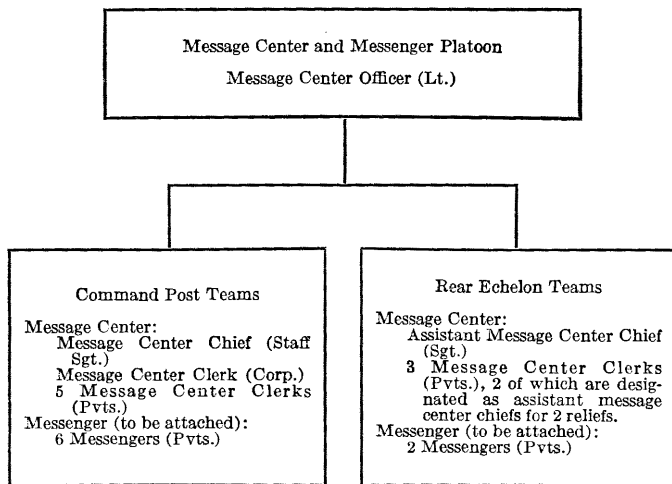


FIGURE 7.—Teams of message center and messenger platoon.

(3) *Wire operation platoon.*—The wire operation platoon is charged with the operation of the wire system of the corps headquarters. On a functional basis, the platoon is divided into a telephone section and a telegraph and telegraph printer section. Each of these sections is organized into teams and reliefs to insure continuous service, the number of such teams depending upon the equipment to be operated. To facilitate training, teams are organized as indicated in figure 8. This organization is based on the assumption that the operation company is assigned to a corps which operates only a command post and a rear echelon.

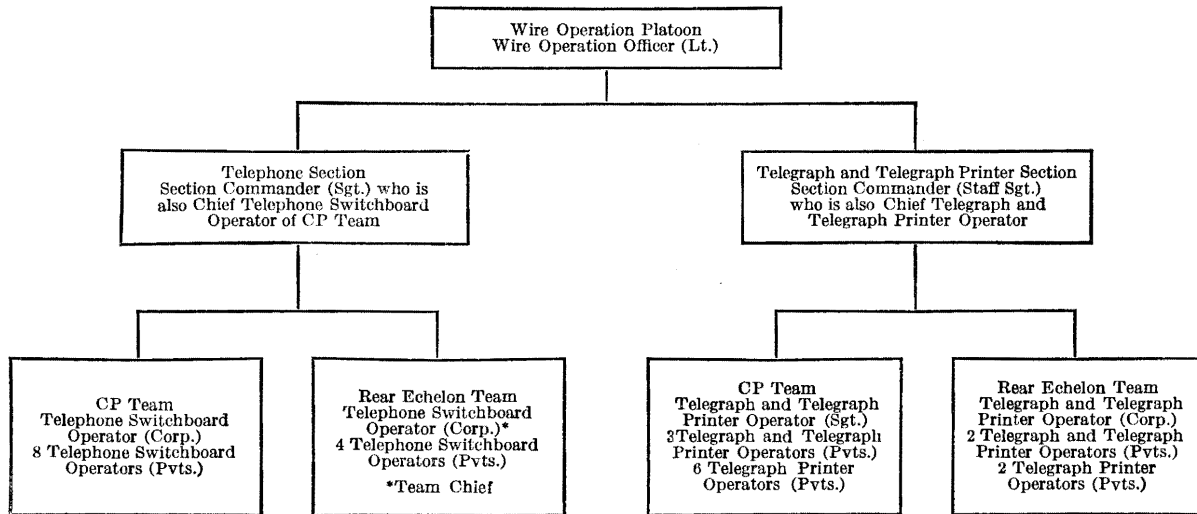
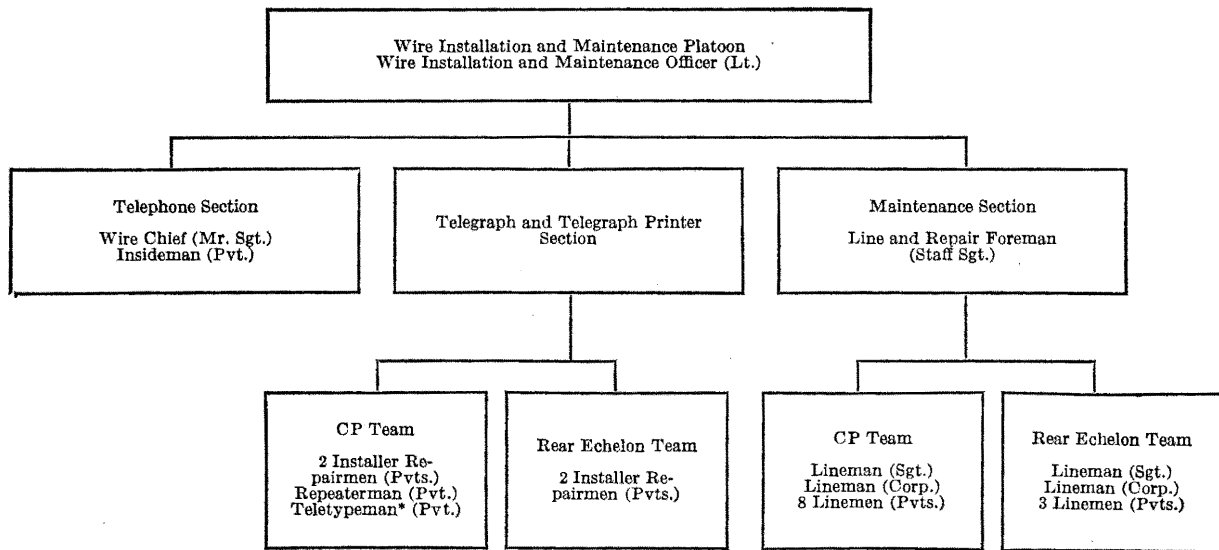


FIGURE 8.—Teams of wire operation platoon.

(4) *Wire installation and maintenance platoon.*—The wire installation and maintenance platoon is charged with the installation and maintenance of the inside plant of the wire system pertaining to the headquarters to which the operation company is assigned. In addition, it installs and maintains short local circuits, installs short trunk circuits, and maintains these short trunk circuits with the assistance of the construction company. (See par. 15.) On a functional basis it is divided into a telephone section, a telegraph and telegraph printer section, and a maintenance section. Each of these sections is organized into teams depending upon the situation and the number of echelons being served. To facilitate training, teams are organized as indicated in figure 9. This organization is based on the assumption that the operation company is assigned to a corps which operates only a command post and a rear echelon.

(5) *Radio operation and maintenance platoon.*—The radio operation and maintenance platoon is charged with the installation, operation, and maintenance of all radio communication for the corps headquarters. The personnel are trained to install, operate, and maintain any one or all of the sets assigned to the platoon, and in addition, to communicate with airplanes by means of panels and dropped and pick-up messages, in order that the platoon may assist the message center and messenger platoon when such assistance becomes necessary. The platoon is organized into teams in accordance with the number and types of stations to be operated. A corps usually operates one station in the army command net, one station in the corps command net, and two vehicular stations, one of which operates in the corps reconnaissance net (fig. 11). To facilitate training, teams are organized in such a case as indicated in figure 10.



*The term "teletypeman" is used in Tables of Organization and in this manual as a shorter term for telegraph printer installer-repairman.

FIGURE 9.—Teams of wire installation and maintenance platoon.

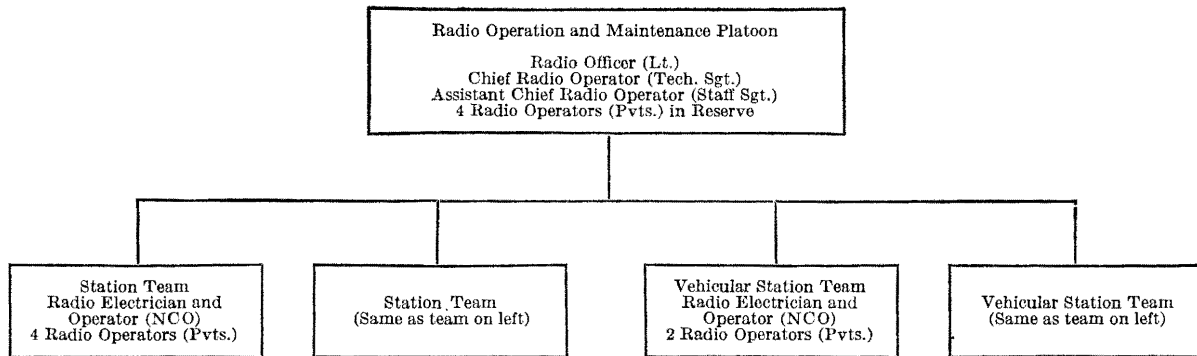


FIGURE 10.—Teams of radio operation and maintenance platoon.

SECTION IV

SIGNAL COMMUNICATION IN THE CORPS

■ 17. REFERENCE.—For all matters regarding signal communication in general, see FM 11-5 and FM 24-5.

■ 18. TACTICAL FUNCTION.—The corps executes the major tactical missions of the army and maintains the continuity of battle. A corps headquarters and its corps and attached troops constitute the framework for a tactical zone of action in which are employed as many divisions as the conditions of each situation require. (See par. 6.) A corps guides and directs the general fighting of its divisions and supports them by the fire of the corps artillery and other means that may be furnished. The width and depth of a corps zone of action are influenced by many factors, such as the maneuver space for the divisions and the full employment of the fire power of the corps artillery.

■ 19. PLANS AND ORDERS.—*a.* The orders of the corps commander are prepared in a similar manner to those of the division. (See FM 101-5.)

b. The content and preparation of signal operation instructions, paragraph 5, corps field orders, the corps signal annex, if any, and orders for corps signal units conform in general to those pertaining to the division as given in FM 24-5. The content and preparation of the signal portions of corps administrative orders, if any are required, conform to those pertaining to higher units as given in FM 11-5.

■ 20. LOCATION OF COMMAND POSTS.—*a. General.*—The signal communication and other considerations entering into the location of all command posts are completely covered in FM 11-5, except for the distances which should separate command posts of higher and lower units.

b. Corps.—Usually when the corps is a part of an army, the army prescribes the location of the corps command post and its axis of signal communication. If the corps is not a part of an army or if the army of which it is a part has not prescribed such locations, they are decided upon and announced by the corps commander. The corps command post should be near enough to the front to facilitate signal

communication with and control of subordinate units for a considerable period of time in case of a successful advance; and yet not so close to the front that its movement to the rear would be required by local reverses. The length of the time required to establish corps signal communication demands that the command post be moved no oftener than required for proper control of subordinate units. No hard and fast rules can be prescribed for the distance at which the corps command post should be located in rear of the front line, but a suitable initial location in an offensive situation will frequently be found between 5 and 10 miles from the front line, and in a defensive situation between 5 and 15 miles from the main line of resistance.

c. *Division*.—When the division is a part of a corps, the corps usually prescribes the location of the division command post and its axis of signal communication. However, the locations of division command posts in some situations may be selected by the division commanders.

(1) *Defensive situation*.—(a) In position defense no displacement of command posts is contemplated. If a general attack is made against the position, it should not be necessary to move division command posts to meet local exigencies of the situation. Consequently a division command post should be located initially sufficiently far to the rear that hostile penetrations or envelopments which do not force a withdrawal from the entire position will not force a displacement of the command post. However, it should not be so far to the rear that long wire lines approaching the transmission limit are required, that radio sets are required to operate near the extreme limit of their ranges, or that unduly long messenger routes result. For a square division, a location should be selected which is from 2 to 5 miles from the front line, and for a triangular division from $1\frac{3}{4}$ to $3\frac{1}{2}$ miles from the front line. The maximum distance in each case is controlled by the terrain and the distance over which satisfactory signal communication can be maintained.

(b) Where a counteroffensive is planned the situation approaches more nearly an offensive situation. (See (2) below.)

(c) In a delaying action the scheme of maneuver has the greatest influence on the location of division command posts.

Factors to be considered include the number of successive positions, the time each is to be occupied, the existing wire installations, and the road net.

(2) *Offensive situation.*—(a) In the attack the division command posts should be located well forward to avoid an immediate displacement when the attack starts. A suitable location can usually be found from 1¼ to 3 miles from the line of departure. In rolling terrain cut up by numerous small streams and ravines and covered by numerous patches of woods, it will frequently be possible to find suitable locations well forward, while in more open terrain it may be necessary to select locations farther to the rear.

(b) When a counteroffensive is planned initially, the requirements of the offensive phase can be fully considered when selecting the initial command posts. However, when the counteroffensive was not originally planned, the command posts of divisions and of the corps may have to be moved to meet the requirements for the offensive phase.

d. *Corps troops.*—The units included in corps troops may be required to operate anywhere in the corps zone of action. The location of a unit in corps troops will depend primarily on the area of employment of the unit. However, consideration should be given to signal communication with corps headquarters and supported units.

■ 21. *AGENCIES.*—Signal agencies employed in a corps system are indicated below. Photographic, signal intelligence, and pigeon means are available in the corps only when allotted by higher headquarters.

- a. Signal supply.
- b. Photographic.
- c. Signal intelligence service.
- d. Signal communication.
 - (1) Message centers.
 - (2) Messenger communication.
 - (3) Pigeon communication.
 - (4) Radio communication.
 - (5) Visual communication.
 - (6) Sound communication.
 - (7) Wire communication.
- e. Liaison airplanes.

■ **22. SIGNAL SUPPLY.**—The corps signal officer is responsible for the signal supply for corps troops. Normally he has no duties in connection with the signal supply of divisions except to assure himself, in the capacity of adviser to the corps commander, that the divisions are adequately equipped and supplied for expected operations. However, when the corps is operating alone, or when administrative and supply functions have been delegated to it by higher authority (par. 7), the corps signal officer has the same duties in connection with the signal supply of divisions that the army signal officer has when the corps is operating as a part of the army. (See ch. 3.)

■ **23. PHOTOGRAPHIC.**—Photographic agencies attached to the corps are employed as directed in the orders attaching them. (See ch. 3.)

■ **24. SIGNAL INTELLIGENCE SERVICE.**—The attachment to the corps of agencies engaged exclusively in the signal intelligence service is unusual. In exceptional circumstances such agencies may be attached, or units of the corps may be required to perform some of the duties of signal intelligence service agencies. (See ch. 3.)

■ **25. MESSAGE CENTERS.**—Message centers are established in the corps at the command post and rear echelon as a matter of routine, and advance message centers are employed as required. Detailed information and instructions as to the routine operation of message centers, and as to the authority of commanders to depart from the procedures outlined, are given in FM 24-5.

■ **26. MESSENGER COMMUNICATION.**—Within the limits of available personnel and transportation (par. 16), messenger communication is employed in the corps as follows:

a. Local messengers at the command post and the rear echelon.

b. Special messengers from each message center.

c. Scheduled messengers between the corps command post, division command posts, and the corps rear echelon. The corps railhead and units of corps troops may be included if located conveniently with regard to scheduled messenger routes.

d. Airplane messengers employing the drop and pick-up method at the command post, and at the advance message center if one is established.

■ 27. PIGEON COMMUNICATION.—Pigeon communication is employed in the corps as follows:

a. Lofts and personnel attached to the corps by higher headquarters are retained under corps control or attached to subordinate units depending upon the situation and the time available to establish lofts and settle pigeons.

b. Lofts retained under corps control are established, pigeons therefrom are distributed to subordinate units, and provision is made for the delivery of messages received at the lofts.

c. When, in lieu of the attachment of lofts and personnel, higher headquarters distribute pigeons to the corps, further distribution to subordinate units is made by the corps, and only in exceptional circumstances are any retained for release by corps headquarters.

■ 28. RADIO COMMUNICATION.—a. *General.*—Radio is a primary means of signal communication in corps reconnaissance elements such as the corps cavalry, corps aviation, and in motorized and mechanized units. In all other units radio communication may be used initially pending the establishment of other means, and is employed to supplement other means or to supplant them in case of failure. As soon as wire communication can be established between units, radio communication may be restricted or discontinued and radio operators employed as telegraph operators. Radio stations are kept in readiness to resume operation when necessary.

b. *Nets.*—Figure 11 shows the nets which may be established in a corps system. It should not be considered as indicating the only nets which may be organized or the only stations which may be placed in the nets. Whenever the situation demands and when suitable sets and frequencies are available, the corps commander reorganizes his existing nets or organizes new nets to meet his requirements for radio communication. In addition to the usual command, reconnaissance, artillery observation, and artillery air-ground nets which resemble those used in an infantry or cavalry division, there

are certain other nets in a corps not ordinarily organized in a division.

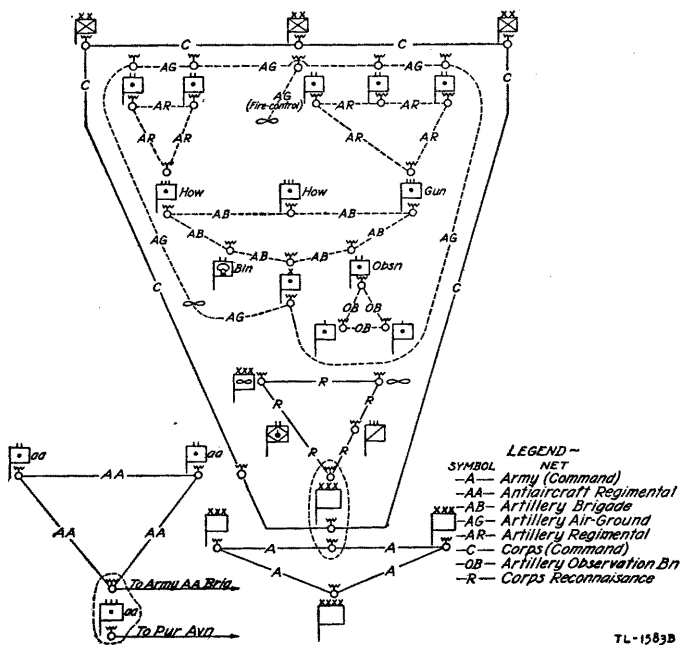


FIGURE 11.—Corps radio nets.

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(1) The command net (C) includes the command posts of the corps, the divisions, the corps field artillery brigade, and may include the antitank battalion and, if the reserve is a division or other unit which has been issued a suitable set, the command post of the corps reserve.

(2) The antiaircraft net (AA) is employed for command and intelligence purposes by the antiaircraft artillery. By a shift of frequency the antiaircraft regimental radio set in this net can also enter the antiaircraft net of the army.

(3) The artillery brigade (AB), artillery regimental (AR), and subordinate nets are similar to corresponding nets within

the division. In each case they comprise a set at the artillery brigade or artillery regimental command post and all subordinate or attached units provided with radio sets which are capable of operating on the net frequency.

(4) The artillery air-ground net (AG) comprises a set at brigade headquarters and one at each artillery battalion of the brigade and such airplanes as may be operating with the brigade on the net frequency. Additional frequencies in the band of the air-ground radio set should be provided to permit observation airplanes to work with an individual battalion.

(5) The observation battalion net (OB) is the command net of the field artillery observation battalion.

(6) Signal communication between balloon companies or observation batteries adjusting the fire of an individual battalion will usually be by direct wire line to the battalion. In an emergency, radio communication may be obtained by radio sets of the balloon company or observation battery entering the radio net of the artillery regiment.

(7) The reconnaissance net (R) includes the command posts of the corps, observation group, corps cavalry, and airplanes serving the corps. It may also include the airdrome of the squadron from which the airplane operates. Whenever traffic is heavy and an additional frequency is available, it may be expedient to organize the reconnaissance units into two nets.

■ 29. VISUAL COMMUNICATION.—Panels are usually the only means of visual communication used in the corps system. They are used at the corps command post and at the command posts of corps artillery and other corps units for communication with airplanes in flight.

■ 30. SOUND COMMUNICATION.—Sound communication is usually employed in the corps system only as a gas, air, or mechanized attack alarm.

■ 31. WIRE COMMUNICATION.—Wire communication is the primary means of signal communication for the bulk of the units in the corps. The wire system includes wire lines, telephone, telegraph, and telegraph printer operating and maintenance equipment, and may also include carrier systems.

For details, see **FM 11-5**. Full use should be made of existing commercial wire facilities in establishing the corps wire system.

■ **32. WIRE TRAFFIC.**—Knowledge of the total traffic transmitted by the telephone and the telegraph is essential in order that the proper circuit facilities and equipment may be provided and the traffic load distributed. This knowledge is obtained by keeping records of telephone connections and telegraph messages transmitted between units in the system. In the absence of these records, estimates are made of the probable traffic loads and the times of maximum or peak loads. Bases for these estimates are the traffic loads in simulated tactical operations and traffic loads of similar headquarters in past operations of our forces or of other nations.

■ **33. TELEPHONE REQUIREMENTS.**—Since the telephone with its equipment is more extensive and elaborate than the telegraph, and since military telegraph circuits are usually superimposed on telephone trunk circuits, the telephone requirements provide the basis of the wire system. The minimum requirements tabulated in *a* and *b* below are estimates to be used as guides only. The number of telephones, local circuits, trunk circuits, and telegraph channels installed and operated depend upon the time available, the requirements of the situation, the existing wire facilities, the orders of the commander, available equipment and supplies, and the capabilities of the signal personnel.

a. Local circuits and telephones.—One telephone is installed on each local circuit, and the extension telephones indicated are installed in addition on the local circuits.

Office or activity	Local circuits	Extension telephones	Total telephones
<i>Forward echelon</i>			
Corps commander.....	1	2	3
Aides.....	1		1
Chief of staff.....	1	1	2
G-1 section.....	2	1	3
G-2 section.....	3	1	4
G-3 section.....	3	1	4
G-4 section.....	2	1	3
Signal section.....	1		1
Corps artillery headquarters.....	3	2	5
Corps engineer headquarters.....	1	1	2
Headquarters corps aviation.....	1	1	2
Chemical warfare section.....	1		1
Antiaircraft headquarters.....	1		1
Message center.....	2	1	3
Telephone central.....	3		3
Telegraph station.....	1		1
Radio stations.....	4		4
Signal battalion.....	1	1	2
Public telephone.....	1		1
Miscellaneous.....	9		9
Total forward echelon.....	42	13	55
<i>Rear echelon</i>			
Adjutant general's section.....	4	1	5
Inspector general's section.....	1	1	2
Headquarters corps quartermaster service.....	3	1	4
Ordnance section.....	2		2
Judge advocate's section.....	1	1	2
Finance section.....	1	1	2
Chaplain's section.....	1		1
Headquarters corps medical service.....	2	1	3
Message center.....	2	1	3
Telegraph station.....	1		1
Telephone central.....	2		2
Radio station.....	1		1
Public telephone.....	1		1
Miscellaneous.....	7		7
Total rear echelon.....	29	7	36

b. Trunk circuits and telegraph circuits.

Unit to which connected	Trunk circuits	Telegraph circuits
<i>Forward echelon</i>		
Divisions (3 each for 3 divisions)	9	6
Corps artillery brigade	2	1
Artillery groupments (2 each for 2 groupments)	4	-----
Antiaircraft artillery	2	-----
Antitank battalion	1	-----
Cavalry regiment (trunk or local circuit)	1	-----
Observation group	2	-----
Combat engineer regiment (1 each)	2	-----
Artillery information service	2	-----
Corps reserve	1	1
Adjacent corps	4	2
Rear echelon	4	2
Army	4	2
Total forward echelon	38	14
<i>Rear echelon</i>		
Medical units (trunk or local circuits)	2	-----
Railheads (corps and divisions)	4	4
Landing fields	2	-----
Commercial systems	2	2
Quartermaster units	2	-----
Forward echelon	4	2
Army	4	2
Total rear echelon	20	10

c. Centrals.—Telephone centrals, utilizing standard military universal switchboards (local and common battery) and associated equipment, are installed at the corps command post, the corps rear echelon, and at advance message centers and switching centrals as required. Existing commercial installations are used to the greatest practicable extent. For switchboards and other items generally comprising a corps central, see FM 11-5.

■ 34. TELEGRAPH REQUIREMENTS.—*a. Circuits.*—Telegraph circuits (par. 33b) are obtained by superimposing them upon telephone circuits.

b. Stations.—Based upon a study of traffic requirements, and within the limitations of available equipment and personnel, manual telegraph sets and telegraph printers are installed and operated so as to render telegraph communication most rapid and efficient. The approximate rates of message transmission to be expected from, and the capabilities and limitations of these installations, are given in FM 11-5. Consideration should be given to the employment of telegraph printers—

(1) For general use between the corps command post and the army, the corps rear echelon, the divisions in the corps, and the observation group; and between the corps rear echelon, the corps railhead, and the army.

(2) For direct communication between the corps G-3 section and the army G-3 section.

(3) For direct communication between the corps G-3 section and the G-3 sections of the divisions of the corps.

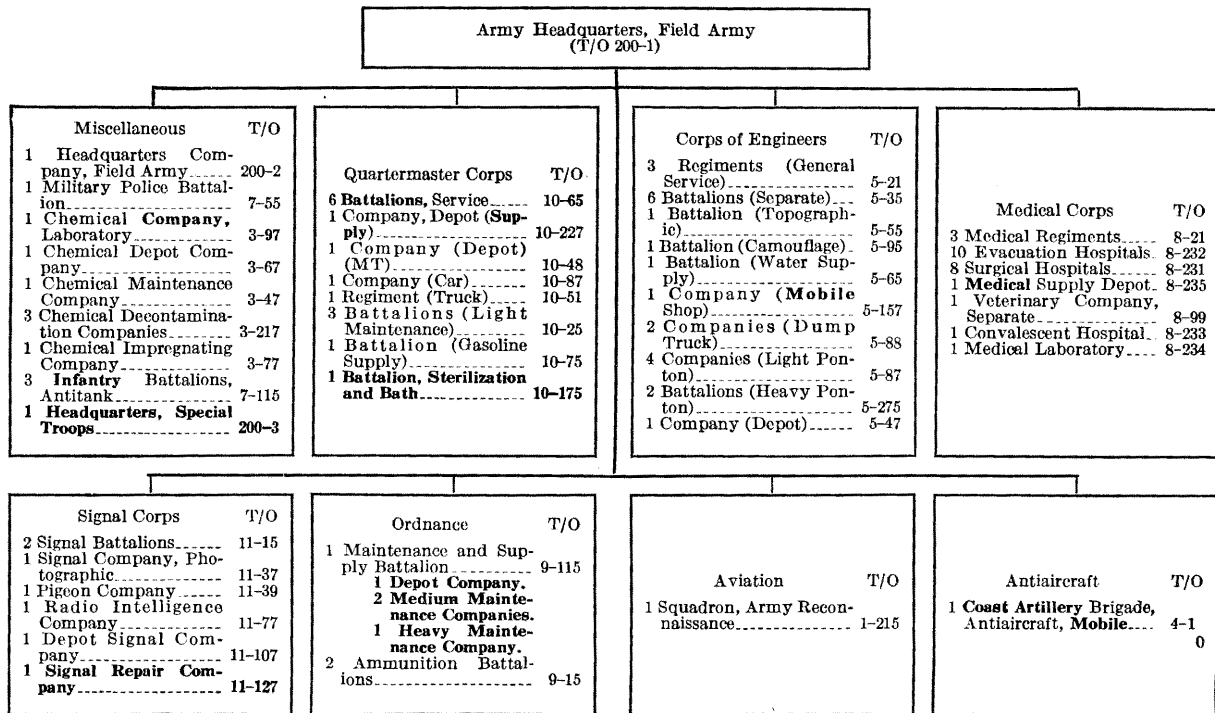
c. Switchboards.—Standard military manual telegraph switchboards should be installed wherever necessary for flexibility and for conservation of equipment and operating personnel. As yet no military telegraph printer switchboard has been standardized. Although present commercial types are not considered entirely suitable, existing installations thereof are utilized. Consideration is given to the installation of additional commercial types, and those necessary are requisitioned.

■ 35. CARRIER CURRENT REQUIREMENTS.—Carrier systems have not been standardized for the military service, but in special situations the use of a carrier system may be justified because of the saving in time, labor, supplies, and transportation involved in the construction of additional wire lines. When the use of a commercial carrier system can be justified, it is requisitioned.

■ 36. POWER SUPPLY.—Provision is made in the design of all standard military signal equipment for the individual power supply required by that equipment. When the amount of

such equipment installed and operated in one vicinity reach the point at which a centralized power supply would be more efficient, suitable commercial power equipment is requisitioned. Except in a stabilized situation, the installation of a centralized power supply source exclusively for signal purposes within the corps is not justifiable. In all cases, however, available commercial power is used in preference to that from small field signal power sources.

[Page glued to the chart that follow it]



(Face p. 29)

FIGURE 12.—Headquarters and army troops, type field army.

[A. G. 062.11 (4-24-41).] (C1, June 12, 1941.)

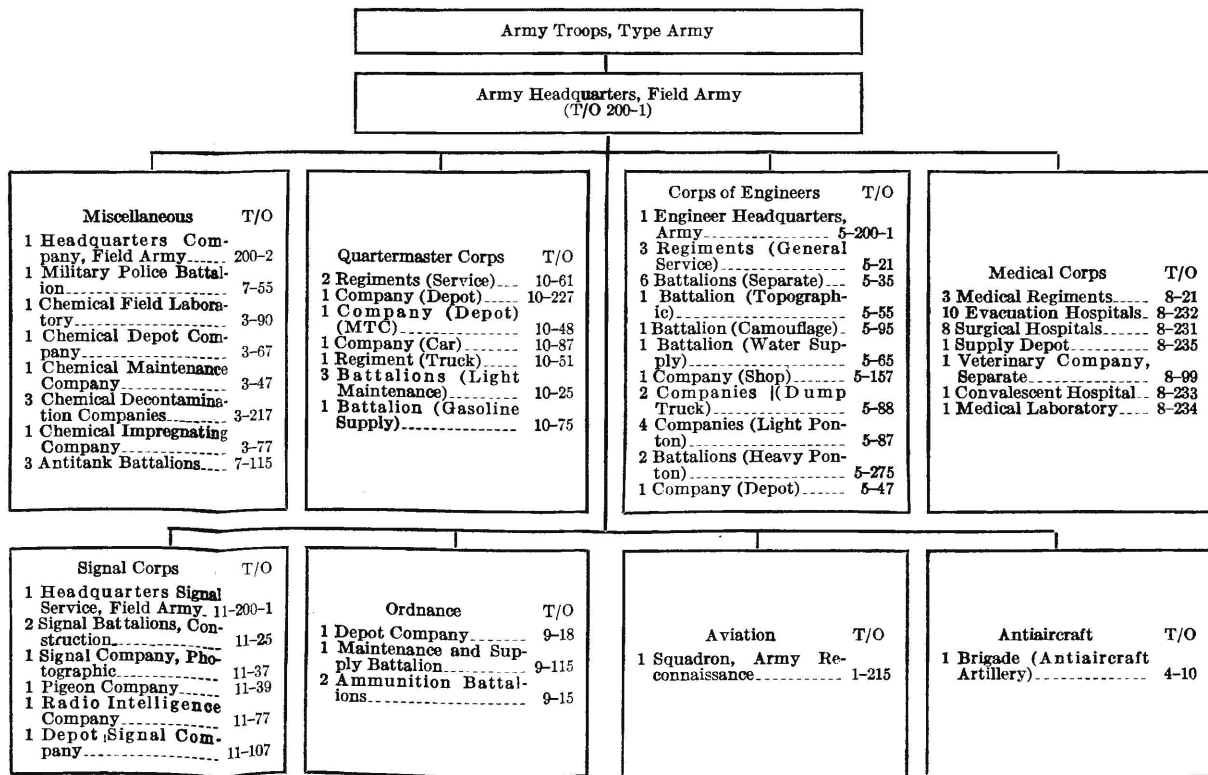


FIGURE 12.—Headquarters and army troops, type army.

CHAPTER 3

ARMY

	Paragraphs
SECTION I. Organization	37-38
II. Headquarters, army signal service.....	39-47
III. Signal company, photographic.....	48-56
IV. Pigeon company.....	57-63
V. Radio intelligence company.....	64-86
VI. Depot signal company.....	87-94
VII. Signal communication in the army.....	95-108

SECTION I

ORGANIZATION

■ 37. ORGANIZATION.—The army consists of an army headquarters, certain army troops, and a variable number of corps. In addition, troops of the GHQ reserve and GHQ aviation (ch. 4) may be attached to an army as needed. Several armies together with certain GHQ troops and aviation may be organized into a group of armies under a designated commander. For the purposes of this manual, a type army containing three corps is used. The headquarters and the army troops of this type are shown in figure 12. Although the strength of an army may vary widely, it may be considered for the purpose of this manual that the strength is about 185,000.

■ 38. ARMY SIGNAL SERVICE.—The army signal service is the signal corps organization assigned to an army. It performs all the signal corps functions for the army except those performed by and within subordinate units. It consists of a headquarters, army signal service, and other organizations shown under "Signal Corps" (fig. 12), and in T/O 11-200. The organization and operations of the headquarters, army signal service; the signal company, photographic; the pigeon company; the radio intelligence company; and the depot signal company are covered in subsequent sections of this chapter. The organization and operations of the two signal battalions assigned to the army signal service are identical to those of the signal battalion assigned to a corps and are covered in chapter 2.

SECTION II

HEADQUARTERS, ARMY SIGNAL SERVICE

■ 39. GENERAL.—The headquarters, army signal service, is the office of the army signal officer, and all of its operations and those of its subdivisions are accomplished by his direction and under his direct control. As indicated in FM 11-5, the army signal officer commands all signal corps units assigned or attached to the army signal service. Subject to such other instructions as may be issued by him, the operations of the various subdivisions of these headquarters are as indicated in paragraphs 42 to 47, inclusive. A general coverage of training, supply, photographic, signal intelligence service, and signal communication functions of the Signal Corps appears in FM 11-5. In addition to contacts maintained by subdivisions of these headquarters as indicated for each below, each maintains close contact with the commanders of units of the army signal service, with corps signal officers, and with corresponding subdivisions of the GHQ signal service.

■ 40. TRANSPORTATION.—Transportation required by this headquarters is obtained from the army headquarters transportation pool.

■ 41. ORGANIZATION.—The headquarters, army signal service, is composed of five sections and a signal intelligence service as shown in figure 13.

■ 42. HEADQUARTERS SECTION.—The headquarters section consists of the army signal officer, his executive officer, and enlisted clerical and drafting assistants. The army signal officer with the assistance of the headquarters section controls and directs the operations of the headquarters, army signal service, and through that headquarters, the operations of the entire army signal service. Among other matters, this section directs and coordinates the preparation of all signal operation instructions prepared by the other sections for issue by army headquarters, and directs and supervises the operations of the signal company, photographic.

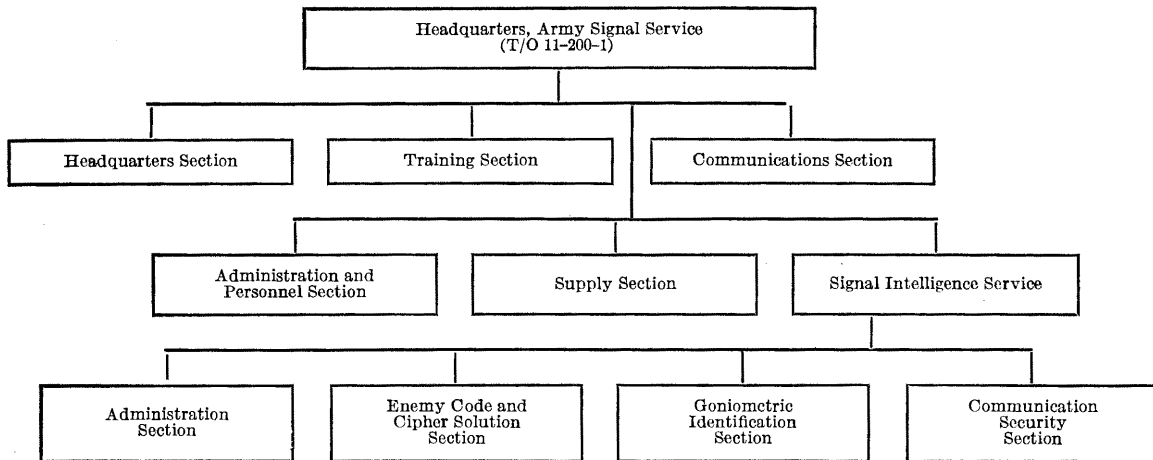


FIGURE 13.—Organization of headquarters, army signal service.

■ 43. **ADMINISTRATION AND PERSONNEL SECTION.**—The administration and personnel section consisting of the section chief and enlisted clerical assistants is charged with the general administration of the headquarters, army signal service, and with the handling of all matters within the province of the army signal officer pertaining to the procurement and assignment of signal and communication personnel and replacements within the entire army. It maintains close contact with G-1 and the adjutant general of the army, and with commanders of replacement centers charged with furnishing replacements to the army.

■ 44. **TRAINING SECTION.**—The training section consisting of the section chief and enlisted clerical assistants is charged with the handling of all matters within the province of the army signal officer regarding the training of signal corps and communication units of the entire army, and the coordination of that training. Among other matters it—

a. Recommends the establishment and discontinuance of troop schools of the Army.

b. Obtains and recommends the circulation of training films.

c. Recommends the nature and extent of inspections of training.

d. Supervises the training of all units in the army signal service.

e. Prepares and recommends the issue of any signal operation instructions considered necessary for training purposes.

f. Maintains close contact with G-3 of the army.

■ 45. **SUPPLY SECTION.**—The supply section consisting of the section chief, an officer assistant, and enlisted clerical assistants is charged with the handling of all matters within the province of the army signal officer regarding the supply of signal corps equipment and supplies to all units of the army. Among other matters it—

a. Recommends and supervises the employment of the depot signal company.

b. Recommends and supervises the establishment and discontinuance of army signal depots and of signal sections of general depots if any are established, supervises the operation

thereof, and makes provision for adequate stocks of equipment and supplies therein.

c. Performs for the signal officer all routine operations regarding the supply of the troops of the army.

d. Maintains close contact with G-4 of the army and with the commanders of the army general depots if any are established.

■ 46. COMMUNICATIONS SECTION.—*a. General.*—The communications section consisting of the section chief, several officer assistants, and enlisted wire and radio plant chiefs, electricians, and clerical assistants is charged with the handling of all matters within the province of the army signal officer regarding signal communication in the entire army. Among other matters it—

(1) Recommends and supervises the employment of the two signal battalions and the pigeon company of the army signal service.

(2) Obtains information as to the signal systems of corps and lower units, and as to all commercial and other signal facilities in the army area.

(3) Plans and makes provision for extensions of the army signal system to relieve corps and divisions of operating and maintaining rear installations, and to permit those units to push their systems forward.

(4) Makes studies of traffic handling in all units of the army, and, based thereon, recommends changes in construction, operation, and maintenance procedures and equipment to expedite or improve such handling, coordinating such action with that of the training section in the training of personnel, and with that of the supply section in regard to providing suitable equipment.

(5) Prepares and recommends the issue of all signal operation instructions considered necessary for signal communication purposes.

(6) Maintains close contact with G-3, G-4, the adjutant general, and the heads of the principal supply services of the army.

b. Functional organization.—On a functional basis this section is organized into wire, radio, and miscellaneous subsec-

tions. Except for the personnel retained by the section chief as his immediate assistants in directing the operations of the entire section, such officers and enlisted men as are necessary are assigned by him to these three subsections. Matters pertaining to several means of signal communication are handled or coordinated by the section chief or his immediate assistants, those pertaining solely to wire communication are charged to the wire subsection, those pertaining to radio communication to the radio subsection, and those pertaining to all other means of signal communication to the miscellaneous subsection.

■ 47. SIGNAL INTELLIGENCE SERVICE.—*a. General.*—The signal intelligence service consisting of the service chief, several officer assistants, and enlisted clerical and other assistants is charged with the handling of all matters within the province of the army signal officer regarding signal intelligence and signal security in the entire army. Among other matters it—

(1) Recommends and supervises the employment of the radio intelligence company, assigns missions thereto, and evaluates the information obtained thereby.

(2) Prepares and recommends the issue of any signal operation instructions considered necessary for signal intelligence service purposes.

(3) Maintains intimate contact with G-2 of the army.

b. Functional organization.—On a functional basis this service is organized into four sections with duties as indicated below:

(1) The administrative section consisting of the service chief and clerical assistants controls and administers the signal intelligence service.

(2) The enemy code and cipher solution section consisting of the section chief and enlisted clerical assistants crypt-analyzes enemy codes, ciphers, and messages coming to it for solution.

(3) The goniometric identification section consisting of the section chief and enlisted radio and clerical assistants is primarily concerned with the position-finding activities of the radio intelligence company.

(4) The communication security section consisting of the section chief and an enlisted clerical assistant recommends action to be taken by any and all units of the army to assure signal security, basing its recommendations mainly on information furnished by the radio intelligence company as a result of interception of friendly radio communication.

SECTION III

SIGNAL COMPANY, PHOTOGRAPHIC

■ 48. **COMMAND.**—The signal company, photographic, is an organic part of the army signal service, and accordingly comes under the direct command of the army signal officer. In operations a large part of the company comprising the corps and division assignment units is usually attached to subordinate units of the army for indefinite periods (see par. 5).

■ 49. **DUTIES.**—The duties of the signal company, photographic, include—

- a. The production of all identification photographs.
- b. The exposure, developing, and printing of photographs pertaining to still photography in such numbers as required within the army, excluding those charged to other arms and services. (See FM 11-5.)
- c. The exposing of motion picture negatives and simultaneous sound recording as required.
- d. The prompt transmission of exposed film to the company laboratory in the case of still photographs, or to the signal laboratory, photographic, GHQ, in the case of motion pictures and sound recordings. The processing, printing, and other essential steps in the production of silent and sound motion pictures after exposure are not included in the duties of the company, but are performed by the signal laboratory, photographic, GHQ. (See ch. 4.)
- e. Maintenance of a file of still pictures and negatives made by the company, together with appropriate records.
- f. The recommending to higher authority and, in the case of attached assignment units, to the signal officers of units to which attached, of measures to be taken for the best accomplishment of the assigned photographic missions.

■ 50. EQUIPMENT, SUPPLIES, AND TRANSPORTATION.—The following principal items in sufficient quantities to permit its effective operation are authorized for the signal company, photographic, by Table of Basic Allowances for the Signal Corps:

a. Still cameras with accessories of the sizes and types required.

b. Negative developing, printing, and enlarging equipment for still pictures.

c. Light weight, field type motion picture cameras, 35-millimeter, with tripods, motors, power equipment, and accessories.

d. Standard type motion picture cameras, 35-millimeter, with tripods, motors, power equipment, and accessories.

e. Motion picture sound recording equipment, 35-millimeter, news type, with accessories.

f. Motion picture projection and viewing equipment with accessories.

g. Reconnaissance trucks, cargo trucks, and trailers equipped as photographic laboratories.

h. Negatives (for still pictures) of standard sizes and types; sensitized paper of various grades, types, and sizes; motion picture negative film, 35-millimeter, in several types; and the necessary photographic chemicals.

■ 51. ORGANIZATION.—The signal company, photographic, is composed of a company headquarters and supply section, a laboratory unit, three corps assignment units, nine division assignment units, two identification units, and two general assignment units as shown in figure 14.

■ 52. COMPANY HEADQUARTERS AND SUPPLY SECTION.—a. The company headquarters and supply section performs all the duties incident to company administration, supply, messing, and unit maintenance of the vehicles of the company. In addition it operates a supply service of photographic materials and equipment for the various units of the company, and a central assignment desk from which the collection and disposition of photographic work are controlled. It consists of the company commander, one lieutenant, first sergeant, mess sergeant, supply sergeant, truckmaster, repairmen, clerks, mechanics, chauffeurs, cooks, two motorcycle messengers, and basic privates.

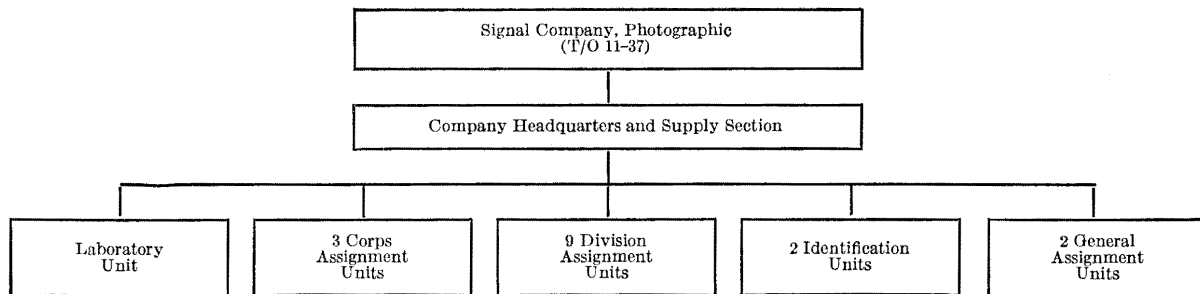


FIGURE 14.—Organization of signal company, photographic.

b. In pursuance of the company mission and missions received from higher headquarters, the company commander directs and supervises the establishment of company headquarters and the laboratory unit, and directs the disposition of the identification units and of the assignment units. He assigns missions to assignment units which are not attached to subordinate headquarters. He directs the shipment of exposed still negatives from the assignment units to the company, and the forwarding of exposed motion picture film and sound recordings, together with finished still photographs, reports, data, information, and recommendations to higher authority. He also acts as adviser to the army signal officer in photographic matters.

c. The duties of the enlisted personnel of this section are indicated by their designations, and are the same as those of other companies.

■ 53. LABORATORY UNIT.—The laboratory unit consists of photo laboratory supervisors, clerks, developer photographers, printer photographers, chauffeurs, a draftsman, and basic privates. It establishes and operates a photographic laboratory for the processing and printing of all still picture negatives exposed by the various units of the company, performs copy work, makes enlargements, produces lantern slides, and other kindred types of work normally performed by a photographic laboratory. It is equipped with a photographic trailer and 1½-ton cargo trucks. When required, it establishes branch laboratories within the army and supplies the necessary personnel and material therefor. It maintains still picture negative and print files, together with appropriate data pertaining thereto.

■ 54. IDENTIFICATION UNITS.—Each identification unit consists of a still cameraman photographer, a developer photographer, a printer photographer, a clerk, and a chauffeur. It produces photographs for information files, passport and identification cards, and for other purposes as required. It is organized and equipped to function independently of the laboratory unit. It is equipped with a ½-ton reconnaissance truck and photographic trailer for the purpose. It is expected that in the early stages of mobilization and operations the identification

units will be employed and moved about in the areas of subordinate units to facilitate the performance of the mission.

■ 55. **CORPS AND DIVISION ASSIGNMENT UNITS.**—The corps and division assignment units are identical in organization and are equipped with identical equipment. Each unit consists of two motion picture cameramen, a still photographer cameraman, a clerk, and a chauffeur. Each is equipped with a ½-ton reconnaissance truck. These units are normally attached to division or corps as indicated by their designations for indefinite periods depending on their particular missions. It is normal to assign the same assignment unit for successive missions with a particular corps or division. These assignment units expose negatives for the production of silent motion pictures and still pictures, and forward each type through designated channels to the signal laboratory, photographic, GHQ, in the former case, or to the laboratory unit or branch laboratory of the company in the latter.

■ 56. **GENERAL ASSIGNMENT UNIT** (news type sound).—Each general assignment unit consists of three motion picture cameramen, a still cameraman photographer, a motion picture sound recordist, two chauffeurs, a clerk, and a basic private for general utility. It is equipped with a ½-ton reconnaissance and a 1½-ton cargo truck. It is normally based with and dispatched from company headquarters, but may be used to supplement or temporarily replace corps or division assignment units. This assignment unit exposes negatives for the production of still pictures and sound motion pictures of the news type, together with the simultaneous recording of natural sound with the latter when required. Exposed films are forwarded by this unit similarly as do corps and division assignment units except that sound recordings are forwarded also to the signal laboratory, photographic, GHQ.

SECTION IV

PIGEON COMPANY

■ 57. **COMMAND.**—The pigeon company is an organic part of the army signal service, and accordingly comes under the

direct command of the army signal officer. In the usual case, orders in the name of the army signal officer are given the company by the communication section, headquarters, army signal service. In operations a large part of the company comprising the bulk of the corps platoons is attached to subordinate units of the army. (See par. 5.)

■ 58. DUTIES.—The duties of the pigeon company include—

a. The distribution of pigeons to combat units, and the collection of empty baskets and other equipment used for such distribution.

b. Cooperation with and assistance to all combat units by training personnel to receive, care for, utilize, and release pigeons properly. In this training, the pigeon's value, possibilities, and limitations are brought to the attention of unit commanders and, when practicable, to the attention of all other personnel of those units.

c. The prompt delivery of each message received at its lofts to addressee or proper message center.

■ 59. EQUIPMENT, SUPPLIES, AND TRANSPORTATION.—The following principal items in sufficient quantities to permit its effective operation are authorized for the pigeon company by Table of Basic Allowances for Signal Corps:

a. Pigeons.

b. Pigeon protective bags for protection of pigeons against gas.

c. Shotguns for destruction of birds of prey in the vicinity of lofts.

d. Command trucks, mobile pigeon loft trailers, and cargo trucks.

e. Baskets of various types.

f. Miscellaneous equipment and supplies, including feed, medical equipment and supplies, utensils, forms, bands, message holders, etc.

■ 60. ORGANIZATION.—The pigeon company is composed of a headquarters platoon and three corps platoons as shown in figure 15.

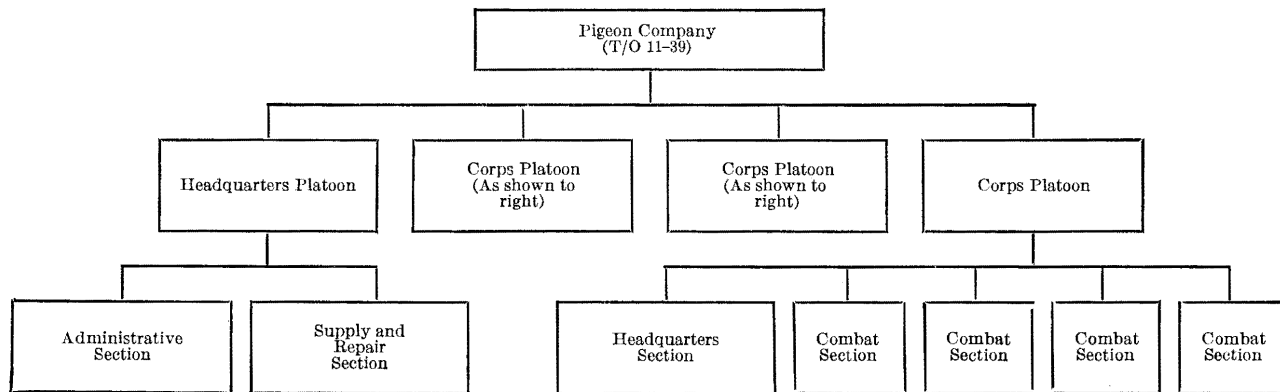


FIGURE 15.—Organization of pigeon company.

■ 61. HEADQUARTERS PLATOON.—*a. General.*—The headquarters platoon is organized into an administrative section and a supply and repair section. This platoon performs all the duties incident to company administration, supply, messing, and unit maintenance of the vehicles of the company. In addition, it establishes, operates, and maintains the fixed lofts, furnishes pigeons and pigeon supplies to mobile lofts as required, and repairs the equipment of the company.

b. Administrative section.—The administrative section consists of the company commander, a first sergeant, clerks, a mess sergeant, cooks, a motorcyclist, and a chauffeur. It administers the company, operating the company headquarters, the mess, and a car. In pursuance of the company mission and missions received from higher headquarters, the company commander directs and supervises the establishment of company headquarters and the fixed lofts. He directs the disposition, establishment, and operation of corps platoons, and combat sections not attached to subordinate headquarters. He directs the distribution of pigeons from the fixed lofts to mobile lofts. He inspects all establishments of the company from time to time to see that they are properly maintained.

c. Supply and repair section.—The supply and repair section consists of the section commander, a motor chief, automobile mechanics, chauffeurs, supply sergeants, clerks, and carpenters. It supplies the entire company, including detached portions thereof, and repairs its equipment. It operates and maintains the necessary motor transportation, and distributes mobile lofts, and pigeons from the fixed lofts to these lofts.

■ 62. CORPS PLATOON.—*a. General.*—Each of the three corps platoons is organized into a headquarters section and combat sections. Each platoon recommends the distribution and locations of its mobile lofts, the distribution of pigeons to those lofts, and establishes, operates, and maintains the mobile lofts as directed by the company commander or by the signal officer of the unit (usually a corps) to which the platoon or a portion thereof is attached.

b. Headquarters section.—The headquarters section consisting of the platoon commander, an officer assistant, and enlisted administrative and motor assistants assigns missions to the platoon and its sections not attached to subordinate units, supervises their operations, and distributes pigeons to mobile lofts of all of its sections.

c. Combat section.—Each combat section consisting of enlisted pigeoneers establishes and operates two mobile pigeon loft trailers, prepares pigeons for distribution to combat units, and assists in that distribution. It collects empty baskets and other equipment used in such distribution. If personnel and time permit, a pigeoneer instructs the personnel of the pigeon post to which distribution is made in the care and employment of pigeons. (See FM 24-5.)

■ 63. OPERATION.—Operations of the company, including distribution and location of lofts, distribution of pigeons, and the employment of pigeons, are covered in FM 11-5, FM 24-5, and TM 11-410.

SECTION V

RADIO INTELLIGENCE COMPANY

■ 64. COMMAND.—A radio intelligence company is an organic part of the army signal service and of the GHQ signal service. In the former case it is under the direct command of the army signal officer. In the latter it is under the direct command of the chief signal officer of the theater of operations. The radio intelligence company may also be employed in coastal or other frontier defense, or in the zone of the interior. When so employed, it comes under the direct command of the signal officer assigned thereto. Normally, orders in the name of the signal officer concerned are given to the company by the signal intelligence service, headquarters, army or GHQ signal service, or one of the sections of the latter. Elements of the company are widely dispersed during operations and may be attached to units subordinate to the army.

■ 65. DUTIES.—The duties of the radio intelligence company include—

a. The establishment, operation, and maintenance of radio stations for the purpose of—

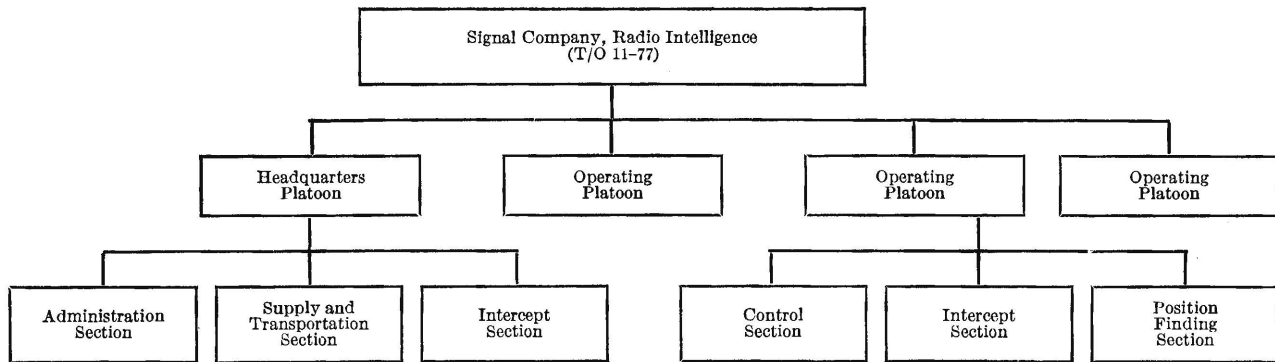


FIGURE 16.—Organization of radio intelligence company.

(1) Obtaining signal intelligence by intercepting enemy radio transmissions, and finding positions of enemy radio stations.

(2) Obtaining information as to signal security by intercepting friendly radio transmissions.

(3) Obtaining information as to unauthorized radio stations by intercepting radio transmissions, and finding positions of such stations located in areas controlled by friendly forces.

b. The installation, operation, and maintenance of the company wire system.

c. The prompt transmission of all signal intelligence and information obtained to headquarters, army or GHQ signal service, or to others directed to receive it.

d. Recommending actions to be taken or procedures to be followed by friendly forces to increase signal security or to suppress unauthorized stations.

■ 66. EQUIPMENT, SUPPLIES, AND TRANSPORTATION.—The following principal items in sufficient quantities to permit effective operation are authorized for the radio intelligence company by Table of Basic Allowances for Signal Corps:

a. Drafting and plotting equipment and supplies.

b. Command and cargo trucks and cargo trailers.

c. Wire, wire-laying, and associated wire communication equipment and supplies.

d. Codes and cipher devices.

e. Radio receiving, transmitting, direction finding, and recording equipment and supplies, including radio command trucks.

■ 67. ORGANIZATION.—The administrative organization of the signal company, radio intelligence, is shown in figure 16.

■ 68. CAPABILITIES.—The signal company, radio intelligence, is capable of the following:

a. Operation of twenty radio intercept stations on a 24-hour schedule under war conditions. These stations are employed in sections of four stations each. Three sections are closely coordinated with position finding activities of the operating platoons and two sections are habitually employed at company headquarters independently of position finding ac-

tivities. The two sections may be detached for service with subordinate units of the army.

b. Operation of 12 radio direction finding stations on a front of about 35 miles under war conditions. These stations are operated in groups of four. Each group is controlled from a single control station at which coordination of its operation with a group of four intercept stations is effected by a platoon commander. A position finding group is incapable of satisfactory detached operation but operating platoons, comprising a position finder section, a control section, and an intercept section, are sufficiently self-sustaining to permit of detached operation.

■ 69. HEADQUARTERS PLATOON.—*a. Administration section.*—

(1) The administration section consists of the company commander, the first sergeant, the mess sergeant, a draftsman, clerks, and cooks. It performs all duties incident to company administration and operates the company mess. The duties of the enlisted personnel of the section are indicated by their designations and are the same as those of other companies.

(2) In pursuance of the company mission, the company commander receives missions from higher headquarters; adds those which he considers desirable; directs and supervises company installations, training, and operations; receives data, reports, and information from his platoons and separate intercept sections; and forwards data, reports, information, and recommendations to higher headquarters.

b. *Supply and transportation section.*—This section consists of the section commander, a truckmaster, a supply sergeant, chauffeurs, mechanics, radio and instrument repairmen, a storekeeper, and a clerk. It is charged with the supply of the company, the operation and maintenance of its transportation, and the repair and maintenance of its signal equipment. The section functions in three teams: the supply team, the motor transportation team, and the radio repair team. All company transportation is grouped in this section but is allotted to other sections and platoons as required.

c. *Intercept section.*—The intercept section of headquarters platoon is organized and equipped in a manner similar to the

intercept sections of the operating platoons (par. 70b). To this section, however, there is assigned, in addition, an officer and two clerks. This additional personnel facilitates the employment of this section for attachment to subordinate units of the army when required. The section habitually operates at the company command post, but may be attached to an operating platoon.

■ 70. OPERATING PLATOON.—*a. General.*—The operating platoon comprises a position finding section, an intercept section, and a control section. Operations of each of these sections are interrelated and the entire platoon operates as a team. The intercept section performs searching and guarding operations. (See *b* below.) The control section, observing the immediate results of such operations, assigns targets to direction finding stations. Data obtained by the direction finding stations are transmitted to the control section where they are utilized to determine the position of the designated target. The control section, through its platoon commander, transmits information obtained to higher headquarters. The organization of each section into teams is shown in figure 17.

b. Intercept section.—The intercept section consists of the section chief and two reliefs of four radio operators each. It is capable of 24-hour operation of four radio intercept receivers. The intercept section operates at the location of the control section and provides the latter section with the information required for directing the operations of the position finding section. Transportation allotted to the section will permit operations of the section to be conducted in the vehicles in which it is transported. Missions are assigned to the section by the platoon commander or, in his absence, by the chief of the control section. The section is assigned both searching and guarding missions.

(1) Searching missions include rapidly searching the radio frequency spectrum for signals of enemy and friendly stations and reporting to the control sections results obtained. These reports cover, principally, station identifications and frequencies used. They may include character, mode, and strength of signals; speed, time, and schedules of transmission; personal characteristics of observed operators; and other identifying information.

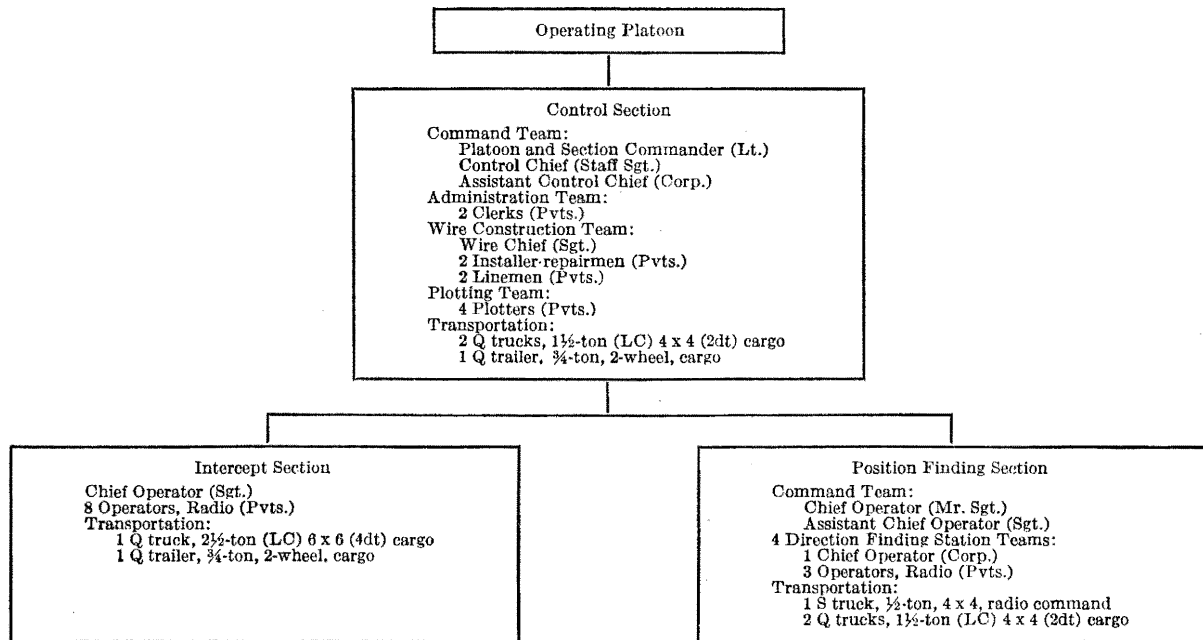


FIGURE 17.—Organization of operating platoon, radio intelligence company.

(2) Guarding missions include a constant watch on a designated frequency, copying or making sound recordings of all transmissions on those frequencies, and sending copies or recordings thereof to the control section.

c. Control section.—The platoon commander, through the control section, directs the operations of the intercept and position finding sections, consolidates information obtained by each, and forwards the consolidation to the company command post. In order that the control section may efficiently perform its function it is provided with personnel for a command team, a plotting station team, a wire construction team, and an administration team.

(1) The command team consists of the platoon commander and two assistant control chiefs. This team assigns missions to the intercept and position finding sections, supervises their installation and operations, and directs and supervises the activities of the other teams of the control section.

(2) The administration team consists of two clerks who assemble data from the intercept section and the plotting station team, and performs all other clerical tasks pertaining to the platoon.

(3) The wire construction team consists of a wire chief, two installer-repairmen, and two linemen transported in a wire-laying vehicle. This team lays the wire circuit required for control of the direction finding stations of the platoon, installs the telephones required at these stations and at the control section, and may be required to construct a wire circuit to company headquarters or a tie-line to a circuit provided by higher headquarters.

(4) The plotting team consists of plotters who receive data from direction finding stations, prepare calibration correction charts, plot on maps the data received, and determine the position of the reported radio stations.

d. Position finding section.—This section consists of a section chief, an assistant section chief, and four direction finding station teams. Each team comprises a team chief and three radio operators. Each team is connected to the wire circuit laid by the wire construction team of the control section and one operator is employed as telephone orderly at the station. Stations operate direction finding equipment and

receive targets or missions from and report azimuths to the control section. The section chief and the assistant chief reconnoiter for exact locations in which each station is to be installed, operate a vehicular radio transmitter during the preparation of calibration correction charts, and during operations serve at the control section as directed by the platoon commander.

■ 71. THEORY OF RADIO POSITION FINDING.—In order that the operations of the company may be more fully understood, an exposition of the elementary theory of radio position finding is presented in paragraphs 72 to 79. Rigorous mathematical analysis of this theory is beyond the scope of this manual. Only so much of the theory is presented as will provide an elementary understanding of position finding operations.

■ 72. DIRECTION FINDING.—It is possible to design an antenna which can be rotated so that its response to radio waves is greatest in one direction. It is also established that radio waves generally travel in great circle paths about the earth's surface. These two characteristics are employed in radio position finding to determine the absolute azimuth of a great circle arc joining a transmitter with the direction finding receiver. By the use of azimuths from two or more receivers, the location of a transmitter can be determined.

■ 73. ANTENNAS.—At the present time military direction finding receivers employ a combination of a loop and vertical antenna, or the Adcock antenna.

a. Loop antenna.—Signal voltages induced in a properly balanced loop antenna by a passing radio wave are canceled out when the plane of the loop is perpendicular to the direction of approach of the wave. Figure 18 shows the response pattern of a properly balanced loop. The lengths of the light arrowed lines indicate the relative response to waves arriving from the directions indicated. With the loop in the position shown in the figure, a wave of given strength will cause the greatest response when approaching from the direction of A or C, and the least response when approaching from B or D. If, therefore, a wave approaches from a given direction, and the loop is rotated so that its plane is at right angles to that direction, the response in the loop will be minimum, and the

signal in the receiver to which the loop is connected will become very weak or disappear. The loop is then said to be in the "null" position with respect to that wave. The use of the null is a much more accurate method of direction determination than that of the point of maximum response, and is used exclusively in direction finding.

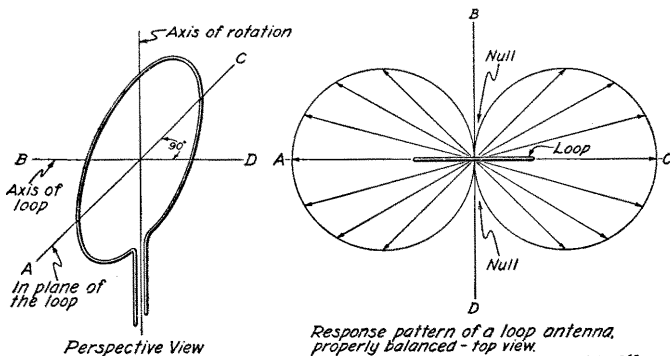


FIGURE 18.—Loop antenna.

TL-1968

b. Sensing.—However, it can be seen in the figure that there are two null positions and that it is impossible using the loop alone to determine whether the wave is approaching from B or D. Through the use of a vertical antenna in combination with the loop it is possible to determine whether, as a matter of fact, the wave is approaching from B or D. This process of determination is known as sensing. As normally employed, the vertical antenna is mounted in the axis of rotation of the loop, as shown in figure 19. By properly adding the signal voltages induced by approaching waves in both the vertical antenna and in the loop, the response pattern of the combination is a cardioid with but one null position. It will be noted that this null is 90° away from those of the loop. Thus, with this combination, the loop may be rotated and a single null obtained for a given wave which will indicate its approximate but positive direction. In practice, after the direction of the wave has been sensed, the vertical antenna is disconnected from the

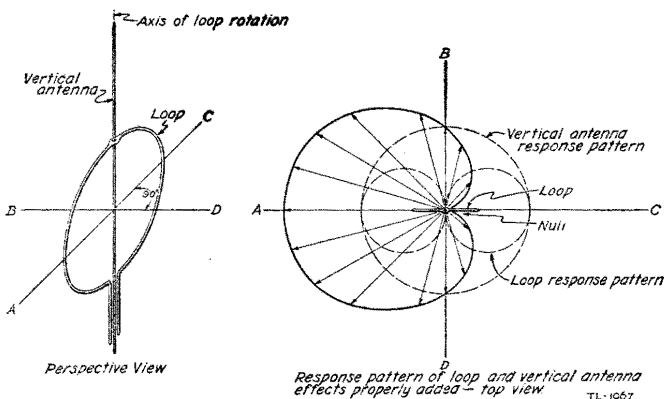


FIGURE 19.—Combination loop and vertical antenna.

circuit, and the loop is rotated to the position at which the original null was obtained. The proper azimuth is then read. This azimuth (determined from the use of loop alone) is employed because a crisper and more accurate null can be obtained than that by using the combination of the loop and vertical antenna. In the practical application of the loop to military direction finding equipment provision is made for careful orientation of the loop to true north for azimuth readings, or to a given base line. Provision for reception of all types of transmission, properly balancing the loop, obtaining nulls, "sensing," and interconnecting with other direction finding stations for a comparison of signals being received are all included.

c. *Adcock antennas*.—Types of antennas developed by Adcock, one of which is illustrated in figure 20, are designed so that only the vertical members of the antennas are effective, and the horizontal members are rendered ineffective either by shielding or by neutralizing them electrically. This type of antenna, perfectly balanced, has a figure-eight response pattern similar to that of the loop antenna, and may be operated for direction finding in a like manner as that for the loop. The Adcock antenna has particular usefulness for direction finding of radio waves of above 3,000 kc. in frequency.

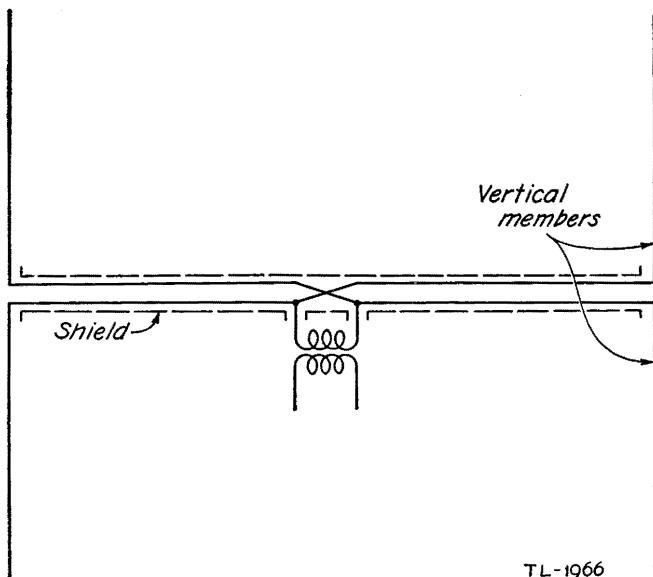


FIGURE 20.—One type of Adcock antenna.

■ 74. ACCURACY OF DIRECTION FINDING UNDER FIELD CONDITIONS.—With present equipment, consistent accuracy of less than 2° of error in direction determination under field conditions has not been attained. Factors which influence the accuracy of direction finding are those which deflect the direction of radio waves from their great circle paths, those which affect the width of the null obtained in the receiver, and others not included in the first two.

a. Factors deflecting direction of radio waves.—(1) Reradiation from electrical conductors in the general vicinity of the receiver antenna.

(2) Terrestrial irregularities in the path. Ground waves, or that part of the whole wave which travels parallel to and close to the earth's surface, are particularly affected.

(3) Coast refraction. Waves which cross a coast line at an oblique angle tend to be refracted slightly, thus altering their observed direction of travel.

(4) Turbulent conditions in the ionized or Kennelly-Heaviside layers of the atmosphere. Such conditions particularly affect sky waves or waves reflected or refracted back to earth, but have little effect on the ground wave.

(5) The above effects vary also with the height of the direction finder above the ground, generally diminishing as the direction finder is raised above the earth's surface.

(6) Generally, errors increase with an increase of frequency.

b. Factors affecting width of null.—(1) The field strength of the wave at the direction finder.

(2) The size of the direction finding equipment.

(3) The type of direction finding antenna. The loop antenna decreases in effectiveness as frequencies are increased above 2,000 kc., and as distance ranges increase. This decrease in effectiveness is more pronounced at night.

(4) Interference effects between the sky wave and the ground wave throughout the zones of their coincidence.

c. Other factors affecting accuracy.—(1) The accuracy of the map used. Except by accident, no azimuth plotted on a map can be more accurate than the map.

(2) The accuracy of location and orientation of the direction finder with respect to the map.

(3) Instrumental accuracy. Similar calibrations coincident with perfect antenna balance must be accurate.

(4) Fading of signals.

(5) Atmospheric conditions.

(6) Skill of operating personnel. A highly skilled operator can interpolate the center of a very wide null $\pm 10^\circ$, and secure an azimuth within $\pm 1^\circ$ in many cases. Under similar circumstances an unskilled operator would be fortunate to have less than a $\pm 5^\circ$ error.

(7) The number of azimuths taken on a given station. The mean azimuth obtained as a result of many azimuths taken on a station at different times will be more dependable than the results of one or few azimuths.

■ 75. STATION SITE.—Some of the factors which deflect the direction of travel of radio waves can be avoided or minimized by the careful selection of direction finding station sites. Such sites should avoid operating electrical equipment,

telephone and power lines, railroad tracks, water courses, and metallic posts, stacks, structures, trees, or high vegetation. Stations should not be located on a pronounced hilltop, on the side of a pronounced hill, or in a deep valley. The ideal location is the center of a large, level, clear plain; a location which is infrequently obtainable in war.

■ 76. CALIBRATION CORRECTION CHARTS.—Regardless of the site at which a radio direction finder station is located, calibration correction charts for that particular location should be prepared if at all practicable in each case. These charts contain corrections in angle which should be added to or subtracted from various observed azimuths to obtain the true azimuth. Figure 21 illustrates such a chart. It will be noted that the abscissas of points on this chart are the observed (uncorrected) azimuths while the ordinates are corrections in degrees to be added to or subtracted from these azimuths to obtain correct azimuths. A minimum of two charts are made for each station, one above and one below 4,000 kc. If time permits, charts are made on numerous frequency bands at different times of the day and night to correct for frequency variations and diurnal changes.

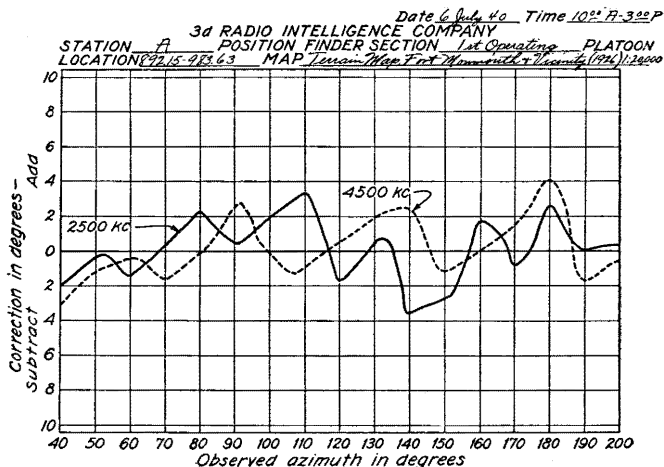


FIGURE 21.—Calibration correction chart.

■ **77. PROCEDURE FOR PREPARING CALIBRATION CORRECTION CHART.**—After accurately orienting a direction finding station and locating it on the map, a target transmitter is sent out toward the front in the sector to be covered by the station. Utilizing existing road nets and operating at a radius of approximately 5 miles, or within the limits of the outpost line of resistance in combat, the target transmitter transmits at a given frequency for 5 minutes from positions easily located on the map. Successive positions are chosen every 10° or 15° in the sector to be covered. The differences between the measured map azimuths and the observed azimuths are the corrections which are plotted on the chart. In the preparation of charts of several direction finding stations each station simultaneously obtains radio bearings of the same target transmitter as it covers the sector. If time permits, the target transmitter transmits on several frequencies at each location for the preparation of charts for each of these frequencies.

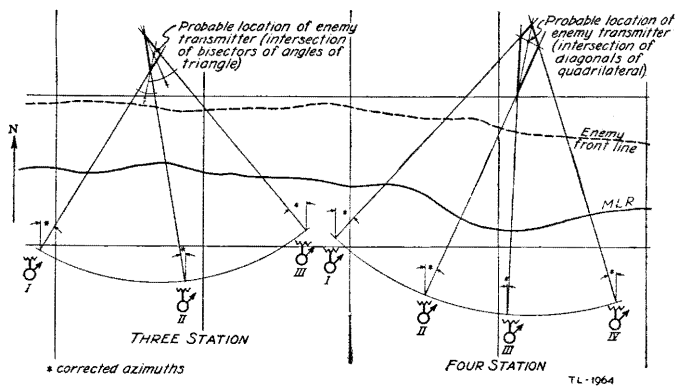


FIGURE 22.—Radio position finding.

■ **78. POSITION FINDING.**—After carefully plotting the locations of two or more direction finding stations on the map, triangulation is employed to determine the location of a transmitter. Simultaneous azimuths are taken by each station and, after correction, are plotted on the map. Theoretically these plotted azimuths should intersect in a point which is the map

location of the transmitter. In actual practice, the observations of three or four stations are used, and the intersections of their plotted azimuths usually result in a small triangle or quadrilateral. (See fig. 22.) In the former case, the intersection of the bisectors of the angles of the triangle is taken to be the most probable location of the transmitter. In the latter, the intersection of the diagonals of the quadrilateral is so taken. The observations of four stations generally result in greater accuracy than those of three. It should be noted that in order to reduce the geometrical probable error, direction finding stations should be as close to the transmitter as practicable, *should be located roughly on the arc of a circle* the center of which is near the approximate center of the area being searched, and should have a maximum practicable distance separation between stations.

■ 79. SPECIAL CASES.—In cases where the transmitter to be located transmits sporadically with long pauses between messages, employs low power, and both time and circumstance prevent the preparation of calibration correction charts by direction finder stations, recourse must be had to an approximate method of solution. The fleeting nature of these transmissions requires that all direction finders operating as a team be capable of rapidly and simultaneously getting on the transmitter and obtaining data quickly. For the simultaneous transmission of instructions to all stations, all direction finder stations must be connected on a single telephone circuit. Separation between direction finder stations is limited by the time available for the wire installation and the amount of wire matériel available. To find the position of enemy stations of low power it is necessary to locate the direction finders as near the targets as practicable. Incidentally such locations provide maximum accuracy in readings. In military operations it frequently will be impracticable to prepare calibration correction charts as described in paragraph 77, since the required area for the target transmitter is denied by the enemy. In such cases, the solution is the establishment of many direction finder stations, and taking the mean of all their observations to balance out local errors. The problem of constructing the necessary wire system and

directing a large number of direction finders on a fleeting target increases in difficulty as the number of stations is increased.

■ 80. EFFECTS OF TACTICAL OPERATIONS.—*a. General.*—Tactical operations affect the operations of the radio intelligence company in varying degree. The effects of some of the more common tactical operations are indicated below:

(1) *Intercept operations* vary but little with the tactical situation. These operations for both long and short ranges consist of searching the workable radio spectrum rapidly and intercepting all types of transmission from both enemy and friendly stations for extended periods of time. The location of the intercept station is to a large extent independent of the terrain, and all activities can be concentrated in one room or tent without affecting the efficiency of operation.

(2) *Position finding* operations vary markedly with the tactical situation. These operations are governed by the distance to and power of radio transmitters employed by the enemy, the extent and frequency of movement thereof, and the tactical maneuver of our forces. In rapidly moving situations, position finders must be prepared to move frequently in order to stay within range and to conform to the movements of our forces.

(3) *Intercept and direction finding operations* are inter-related to the extent that intercept stations usually first detect enemy transmitters and the information is then relayed to the direction finders for their action. To increase efficiency, the control team, the plotting team, and intercept team of each platoon are grouped in one room or tent close to and in ready communication with the direction finder establishment.

b. Concentration.—During the concentration and the march of the army where contact with the enemy is remote and enemy transmissions are out of range, only the control and intercept sections of the company are employed. They are concerned with friendly signal security which includes cryptographic security, proper frequency adherence, observation of regulations governing radio operations by the various radio nets and systems of the army, and recommendations for strengthening of signal security.

c. Contact with enemy.—During the march prior to contact with the enemy when contact is imminent, and during the meeting engagement, intercept sections are constantly on the watch to detect enemy transmissions. Hostile transmissions are usually from high-powered slow-moving transmitters pertaining to enemy higher headquarters. If a direction finder station ascertains by trial that the enemy signals are within its range, one operating platoon initiates operations. The operating platoons may leapfrog each other, one platoon remaining in operation until a second is established farther along the axis of the advance.

d. Stabilization.—In the stabilized or defensive situation where little movement is expected, all elements of the company are in operation. All intercept teams are concerned with friendly signal security and the guarding of channels employed by the enemy. All operating platoons make a comprehensive radio reconnaissance of the enemy radio system. The displacement of enemy stations, including those of cavalry, mechanized, and air units and establishments, and the opening up of new stations may indicate a change in tactical dispositions or the arrival of enemy reinforcements.

e. Limited attack.—In the limited attack where the advance is not expected to force back the enemy beyond the range of direction finding equipment, all platoons in the area concerned are moved up as close to the front lines as possible and continue normal operations.

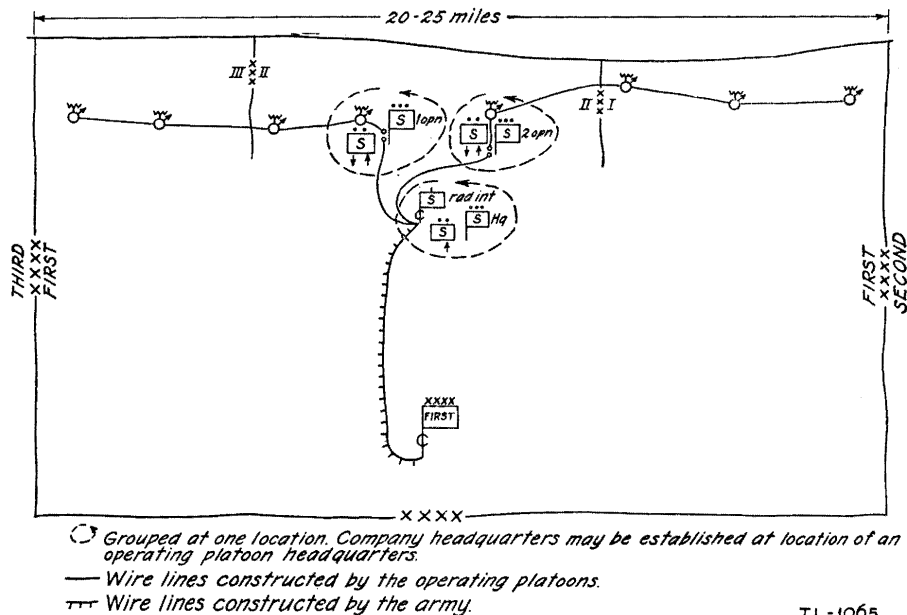
f. Large scale offensive.—In the large scale offensive, only a portion of the army will generally make the main attack. If only one operating platoon is located in the area from which the main attack is launched, it may be outranged by the forward movement of the attacking forces and have to suspend operations until a suitable forward position can be found in the event the advance is held up. It is, therefore, preferable, if continuous radio intelligence operations in the area of the main attack are desired, to assign two operating platoons to this area. Successive displacement by platoon will permit continuous operation. Displacement of a platoon assigned to the area in rear of other portions of the front will be less frequent and may be accomplished by successive displacement of direction finding stations within the platoon.

g. Pursuit.—If the attack is successful, and the pursuit commences, it may be expected that a great part of the enemy wire system will be disrupted and that he will take recourse to radio communication. Intercept and position finding operations then assume extreme importance, and all establishments are set up wherever and whenever opportunity permits, considerations of time of establishment, and speed of enemy withdrawal or retreat being borne in mind. If the movement is too rapid it may be only feasible to engage in intercept operations.

■ 81. *DISPOSITION.*—The radio intelligence company is required to cover an area approximately the size of an army which in a stabilized situation has a front of about 20 to 25 miles and a depth of about 20 miles. Figure 23 shows a possible disposition of the company in a stabilized situation. Operating platoons are frequently established within 3,000 yards of the front line and may in some instances be as far forward as the outpost line of resistance. For maximum effectiveness the direction finding stations of a platoon located within 3,000 yards of the front line are located so that the total distance between end stations will not be more than 10 miles. Operations may be conducted with the direction finding stations located from 7 to 12 miles behind the front lines. When initially installed at such distances direction finders of the end stations of a platoon may be 20 to 25 miles apart. Where additional radio intelligence units are assigned to the army, they may be attached to the organic company, or operate independently under the signal intelligence service. They may be established in any part of the army area and operate simultaneously with the organic company as all are mutually noninterfering.

■ 82. *CONTROL.*—*a. General.*—Instructions which pertain to the radio intelligence company may be included in paragraph 3 of either the signal annex or the intelligence annex to field orders, or may be conveyed by messages. They are transmitted to the company by the signal intelligence service of the headquarters to which the company is assigned. These instructions state the missions or results desired; the company is responsible for employing the correct technique to obtain results.

b. The *company commander* prescribes the details of technique necessary to produce the desired results. He is familiar with the general and special situation; the scheme of maneuver; the zones of action, disposition of army, corps, and division headquarters and forces; the signal system; and other pertinent data available in field orders, or situation maps, or from the signal intelligence service which maintains



TL-1965

FIGURE 23.—Tactical disposition of army radio intelligence company.

close contact with G-2. Company orders include the missions of the various platoons, the areas or general locations they are to occupy, their general tasks, and the location of their command posts. Orders may direct evacuation or displacement of platoons upon accomplishment of a mission or as required by the tactical situation.

c. The *platoon leaders*, after receiving information of the situation and the company orders, make with the company commander a preliminary map reconnaissance of the areas to be occupied and covered. The platoon commanders then direct the activities of their platoons.

■ 83. **COMMAND POSTS.**—*a. Company.*—The command post of the radio intelligence company is usually located at or near the headquarters of one of its operating platoons. It may, however, be located near the command post of the unit to which assigned or attached. In any case facilities are required to insure the rapid exchange and coordination of instructions and intelligence data between the company headquarters, the signal intelligence service, and the intelligence section of the general staff. The unit signal officer is responsible for providing wire lines between the company command post and the headquarters to which the company is assigned or attached. When the company command post is located at or near the higher headquarters and at a considerable distance from the command posts of its platoons, the unit signal officer is responsible for providing wire lines between the company command post and its platoons. The intercept section of headquarters platoon habitually operates at the company command post.

b. Operating platoon.—The platoon command post, the intercept stations, and control section are grouped together and located at or near the site occupied by one of its direction finding stations. Figure 24 shows a schematic establishment for the platoon.

■ 84. **DIRECTION FINDING STATIONS.**—The location of direction finding stations is dependent upon the factors discussed in paragraph 75. Sites selected for all direction finding stations should be easily recognized and identifiable on the ground as well as on the map. The platoon constructs a single field wire

line connecting its direction finder stations with its command post and control section for the simultaneous and rapid interchange of information. When the platoon is initially located at distances of 7 to 12 miles from the front line it may be desirable to increase materially the distance between direction finding stations. The time of installation may be reduced by locating each station where advantage may be taken of existing signal communication facilities instead of constructing the wire line mentioned above.

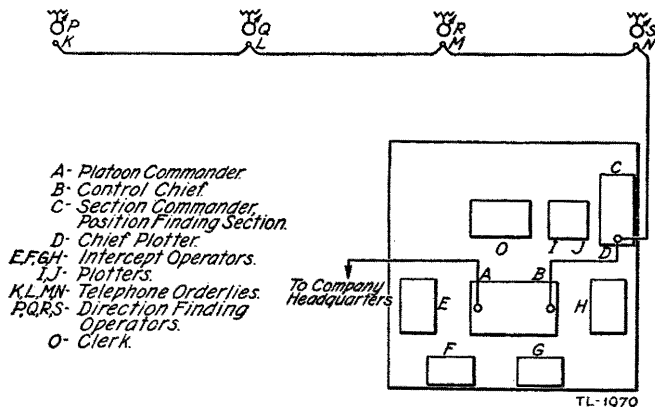


FIGURE 24.—Schematic field establishment of operating platoon.

■ 85. INITIAL OPERATIONS.—*a. Company command post.*—The intercept section of headquarters platoon initiates its operations. Signal facilities to higher headquarters are provided by higher headquarters. Wire lines to operating platoons are laid by company wire construction personnel.

b. Operating platoon.—Upon receipt of orders the platoons proceed to the designated location of their respective command posts. The control section is established and is connected by wire line to the company command post. The intercept stations begin operation at once. The platoon commander together with the chief or assistant chief of the position finding section makes a rapid terrain reconnaissance for suitable direction finder locations. The direction finder teams

are directed to establish stations at the selected locations. If time and space permit, they proceed with obtaining data for the preparation of calibration correction charts. The wire team meanwhile constructs a wire circuit connecting all direction finding stations and the control section.

■ 86. **TECHNIQUE OF OPERATION.**—The following is a typical synopsis of events. (See fig. 24):

a. To permit rapid differentiation between friendly and enemy stations, intercept operators are furnished lists of call signs and frequencies of all friendly stations in the bands they are assigned to search.

b. Operator G, while searching the 3,000-4,000 kilocycle band, hears JG4 on 3,600 kilocycles, which he identifies as an enemy station.

c. Operator G notifies control chief B and proceeds to copy the message in duplicate.

d. Control chief B verifies the identity of station JG4, and decides whether the station should be rejected, or that operator G continue to copy its transmission. He decides whether its position should be found depending on the mission received by him.

e. If control chief B decides that the position of JG4 be found he informs operators K, L, M, and N of the call sign, the frequency, the mode of transmission, and other distinguishing data on that station, and directs each of them to determine its azimuth. If the platoon commander has directed a "ringing net" for the telephone circuit, the control chief must ring operators K, L, M, and N. If the platoon leader has directed an "alert net" in which a continuous watch is maintained on the telephone circuit, he speaks to them at once.

f. Direction finder operators P, Q, R, and S tune immediately to the proper frequency, identify the transmission, and obtain the azimuths. (If necessary, the signal being received by intercept operator G can be put on the telephone circuit so as to enable direction finder operators to compare it with the signal being received in the direction finders.)

g. Beginning at the left, each direction finder station reports the azimuth.

h. Chief plotter D compares the azimuths received with calibration correction charts of the stations concerned, and calls off the corrected azimuths to plotters I and J.

i. Plotters I and J plot the corrected azimuths on the map and determine the coordinates of station JG4.

j. Platoon leader A telephones or dispatches a copy of the intercepted message with the map coordinates of station JG4 noted thereon, together with pertinent remarks, to the company headquarters.

k. The second copy of the intercepted message is collected by clerk O, who types a skeletonized version together with appropriate notes on the consolidated log sheet. This copy and log sheet are filed at the station for possible future reference.

SECTION VI

DEPOT SIGNAL COMPANY

■ 87. **COMMAND.**—The depot signal company is an organic part of the army signal service and of the GHQ signal service, and, accordingly, comes under the direct command of the army signal officer or the chief signal officer of the theater of operations, respectively. It may also be employed in the zone of the interior, in which case it comes under the direct command of the signal officer concerned. In the usual case, orders in the name of the proper signal officer are given to the company by the supply section, army or GHQ signal service. Storage and issue sections augmented by repair sections of the signal repair company may be detached to provide a small depot when required. The repair section of this company is not organized to provide detachments.

■ 88. **DUTIES.**—Although the duties of this company may vary slightly if it is assigned to a headquarters other than the army, this section is based on the assumption that it is assigned to an army. The duties of the depot signal company are the establishment, operation, and maintenance of one or more signal depots, which include—

a. Local procurement of such supplies and equipment as may be directed or authorized.

b. The receipt, classification, storage, and issue of signal supplies and equipment, and installation and operation of facilities required therefor.

c. Installation and operation of facilities for the repair and reclamation of signal supplies and equipment, including the inspection of salvage and captured materials as received in rear areas from forward combat units, and the segregation and receipt of portions thereof pertaining to the Signal Corps.

d. Recommending to higher headquarters actions and procedures to be taken or followed by using units to conserve signal equipment and supplies.

■ **89. EQUIPMENT, SUPPLIES, AND TRANSPORTATION.**—The depot signal company is authorized light and cargo trucks by Table of Basic Allowances for Signal Corps. This table, however, does not prescribe the various equipment and supplies necessary for its depot and repair functions. These are considered a part of the depot installation and are estimated for and procured concurrently with the depot. The installation thereof in a depot, however, is a proper duty of this company.

■ **90. ORGANIZATION.**—The depot signal company is composed of an administration section, three storage and issue sections, and a repair section as shown in figure 25.

■ **91. ADMINISTRATION SECTION.**—*a.* The administration section performs all the duties incident to administration, supply, and messing of the company. In addition it performs the administration of the depot establishments, and the mimeographing and multigraphing for the other sections of the company. Although extensive procurement of equipment and supplies by depots in the theater of operations is not contemplated, this section procures locally such supplies and equipment as may be directed or authorized. It consists of the company commander (major), first sergeant, clerks, mess sergeant, cooks, supply sergeant, and basic privates for general utility.

b. In pursuance of the company missions and missions received by it from higher headquarters, the company commander directs and supervises the establishment of the company headquarters and of one or more signal depots. He directs the evacuation and the removal to new locations of

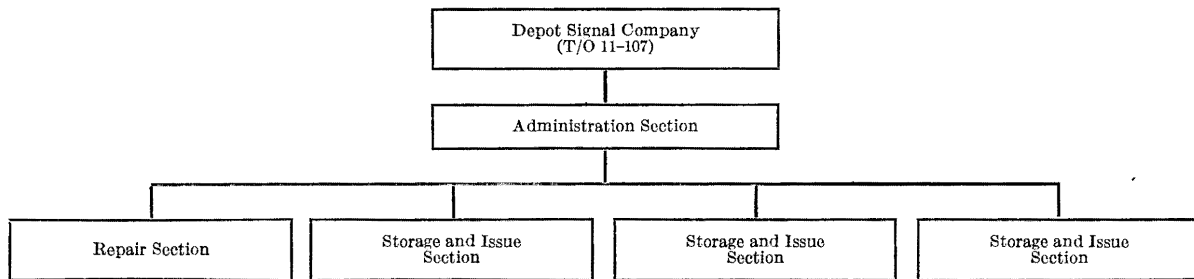


FIGURE 25.—Organization of depot signal company.

such depots, requesting the necessary transportation from the army, and determining the priority of movement of various parts of the company and supplies of the depot. He recommends the site and space required for depot installations, after making the necessary preliminary reconnaissances. He supervises the operation of the depot, making such changes in administration as he considers necessary and, within such limitations as may be prescribed by the army signal officer, determines the priority of shipments and repairs. He renders the necessary reports and recommends to higher authority actions to be taken for the conservation of signal supplies.

■ 92. STORAGE AND ISSUE SECTIONS.—A storage and issue section consists of a section commander (a lieutenant), clerks, electricians, warehouseman, carpenters, shipping packers, chauffeurs, typists, and basic privates. It handles property of the depot, maintains adequate stocks, receives incoming shipments, safeguards property on hand, and fills requisitions. Replenishment of stock is based upon past issues, current demands, future tactical operations, and the anticipated operations of the depot. If credits are established, the section keeps records thereof together with drafts made upon them, making timely reports of depletion of stocks to the supply section, army signal service, and to those having the credits.

■ 93. REPAIR SECTION.—The repair section consists of a section commander (captain), clerks, mechanics, electricians, salvagemen, carpenters, instrument repairers, machinists, woodworkers, painters, telegraph printer maintenance men (par. 16b(4)), welder, and basic privates. It operates all repair and reclamation facilities of the depot to which assigned. It receives all unserviceable equipment and supplies shipped to the depot. It inspects salvage and captured material, selects that which pertains to the Signal Corps, repairs or reclaims all that is repairable, and turns these items over to the storage and issue section. It disposes of those items which are not repairable as directed in standing instructions. If, in making repairs, it discovers evidence of abuse of equipment by users, it brings such evidence to the attention of the company commander. (See par. 91b). It is responsible that

repair parts and supplies are available in the depot in sufficient quantities to permit prompt and effective repairs of signal equipment. The organization and equipment of the repair section does not permit detachments. Sections of a signal repair company provide repair detachments for small depots.

■ 94. OPERATIONS.—*a. General.*—Under exceptional circumstances the company may be required to operate two depots but with reduced functions at one or both. In such cases the administration, storage, and issue functions are carried on in both, but repairs requiring installed facilities are made only at one.

b. Location of signal depot.—The depot must be located very close to a main railroad line, a good motor road net, or good water transportation facilities. Equal consideration must be given to road facilities to the front to using organizations, as well as to the rear.

c. Selection of depot site.—In addition to requirements of *b* above, consideration must be given to space requirements in the selection of the depot site. These include the space required for the storage of equipment and supplies which can remain in the open, for the warehousing of that which must be under cover, for the storage of salvaged and captured equipment awaiting reclamation, for the repair shop and its associated toolroom and repair parts stock, and for the offices, barracks, and mess hall of the company. These space requirements will vary and depend upon the composition of the army being served, that is, the number and types of corps, divisions, and other units it contains, upon its need for signal supplies; upon the tactical situation; and upon the character and availability of various items of equipment. Based on a 5 days' supply of organizational signal equipment for three type corps (see fig. 1) comprising a type army, and computed from Table of Basic Allowances, and Maintenance Factors for the theater of operations published by the office of the Chief Signal Officer, the table below is presented as a rough guide only. It does not include provisions for supplies for army troops which must be estimated from their composition. The table does not provide for supplies and equipment

required in the construction and establishment of special wire and radio plants, such as permanent telephone centrals, cable and aerial lines, repeater stations, radio stations and power plants, etc., which must be estimated and provided for specially as their requirements arise. However, it may be expected, particularly in initial installations that the space requirements, including the outdoor storage of poles, wire, and cable for a depot, will be approximately $\frac{1}{2}$ mile square.

(1) *Weight of supplies.*—Five days' maintenance of organizational signal supplies for three type corps of a type army, 100 tons.

(2) *Space requirements.*

	<i>Square feet</i>
(a) <i>Administration section.</i>	
Office space.....	1, 000
Barracks, mess hall, latrine.....	6, 000

(b) *Storage and issue section.*

Office space.....	800
Covered storage space (includes aisle space)	5, 000
Open storage space.....	7, 500

(c) *Repair section.*

Office, toolroom, and repair parts storage.....	1, 000
Repair shop space.....	2, 000

d. *Interior administration and operation of depot.*—(1) Administration and operations in the signal depot conform to the instructions listed below, except as modified by the plan of the chief signal officer of the theater of operations or other competent superior authority.

AR 5-series.

AR 30-955 Transportation of supplies.

AR 35-6520 Property accountability and responsibility.

AR 35-6540 Requisitioning property.

AR 35-6560 Receipt, shipment, and issue of property.

AR 35-6620 Expendable property.

AR 35-6640 Lost, destroyed, damaged, or unserviceable property.

AR 35-6680 Transfers of property accountability.

AR 35-6720 Blank forms pertaining to property accounting.

AR 700-10 Storage and issue.

Circular 1, and Supply Letters, Office of the Chief Signal Officer, Signal Corps General Catalogue.

(2) The primary duty of the depot is the prompt filling of requisitions. The maintenance of adequate amounts of proper stocks and the replenishment of depleted stocks are essential. The company commander therefore maintains an up-to-date file in which appears the total quantity of items on hand, serviceable and unserviceable listed separately; approved maximum and minimum quantities authorized for his depot; quantities on order for the depot; quantities being requisitioned by subordinate units, for which no stock is immediately available; and quantities being consumed periodically (daily or weekly) by using organizations of the army. He maintains close contact with the supply section, headquarters, army signal service, keeping it constantly informed as to the status of his stocks and other depot matters. From this supply section he obtains information as to the status of stocks ordered by him; anticipated shipments of new items to the depot; anticipated increased needs of using organizations, or of new organizations being added to the army; changes in the supply plan, or tactical situation and their possible effects upon the depot. Based on such information he takes the necessary steps for the maintenance of adequate stocks.

e. Movement of depot.—The signal depot may be moved to conform to the tactical situation because of more convenient and accessible transportation facilities at a new location, for better protection against aerial or ground attack, or for other reasons as directed by higher authority. The move may consist of the opening of a depot at the new location, rerouting incoming shipments to it, and operating the old depot meanwhile until all stocks at the latter are exhausted. In such case the repair section may be moved at any time depending on the availability of transportation and the time required for the installation of repair equipment at the new location. On the other hand, it may be necessary to close the depot at once, and move as much of the stock and equipment as possible to a new location within a short period of time. In either case the duration of the move and the amount of equipment and supplies to be moved depend upon the time, personnel, and the transportation available.

f. Motor transportation.—Motor transportation authorized for the company is employed for moving company personnel, supplies, and equipment, and for the interior and local administration of the depot. It is not used for the delivery of incoming shipments or outgoing shipments to using organizations.

g. Handling shipments.—Company personnel unload all incoming shipments and prepare and load all outgoing shipments regardless of the means of transport employed. When company personnel is insufficient to handle particular shipments, additional labor is requested from the army commander through the army signal officer.

h. References.—The operation of the signal depot is intimately related with the operations of the supply system in the army. For general supply operations in the army, see FM 100-10; for operations of the signal supply system, see FM 11-5; for general engineering data on depots, see FM 5-20.

SECTION VII

SIGNAL COMMUNICATION IN THE ARMY

■ 95. **ORDERS.**—The content and preparation of signal operation instructions, paragraph 5 army field orders, army signal annex, and orders for army signal units conform in general to those pertaining to the division as given in FM 24-5. The content and preparation of the signal portions of army administrative orders conform to those pertaining to higher headquarters as given in FM 101-5.

■ 96. **LOCATION OF COMMAND POSTS.**—*a. General.*—The signal communication and other considerations entering into the locations of all command posts are completely covered in FM 11-5, except for distances which should separate command posts of higher and lower units. Because of the extent of the signal system required by the army, particular emphasis must be placed on existing communication facilities in the selection of the army command post.

b. Army.—Usually when the army is part of an army group, or directly under a GHQ, the group or GHQ commander prescribes the location of the army command post. If the

SIGNAL CORPS FIELD MANUAL

CHAPTER 3

ARMY

SECTION VII

SIGNAL REPAIR COMPANY

■ 94 $\frac{1}{4}$. **COMMAND AND DUTIES.**—*a. Command.*—The signal repair company is assigned to the army signal service and to GHQ reserve. In the field army it operates under direct command of the army signal officer. He may exercise control over it through the supply section of the headquarters, army signal service, or he may place it under the signal depot commander. When such a company is allotted from GHQ reserve, it will operate under control of the signal officer of the unit to which it is attached.

b. Duties.—The duties of the signal repair company will include—

(1) Prompt maintenance at all points within the field army, or, when allotted from GHQ reserve, within the unit to which it is attached. This will be accomplished by repair and return of or by replacement of faulty equipment.

(2) Reclamation of signal supplies and equipment when sections of the company constitute part of a small depot.

(3) Recommending to higher headquarters actions or procedures to be taken or followed by using units to conserve signal equipment and supplies.

■ 94 $\frac{1}{2}$. **TRANSPORTATION, EQUIPMENT, AND SUPPLIES.**—*a. Transportation.*—Each repair section of the company is provided with one bus body type truck to provide a mobile repair shop, one cargo truck, and one cargo trailer. This transportation is barely adequate. Only with rigid economy in loading is it possible to transport personnel, equipment, and supplies pertaining to the section. The additional cargo transportation provided for the company headquarters is inadequate to permit the company headquarters to transport its personnel and supplies in one trip.

b. Equipment and supplies.—Each repair truck is provided with permanently installed test and work benches, drawer

SIGNAL CORPS FIELD MANUAL

equipment, electric heating and lighting equipment, and fans. A repair section is provided with bench and hand tools and testing equipment for joint use by all repairmen of the section. An individual kit of tools for each repairman except section chief is included in the section allowance. Spare parts appropriate to the equipment for which it will usually make repairs are authorized. These spare parts and replacement units are obtained from the signal depot company. One of the cargo trailers of each repair section carries an electric power unit large enough to provide power for testing, for operating electric tool equipment, and for heating and lighting the repair truck to enable repairmen to work in comparative comfort. Repair sections are not equipped for heavy metal working or welding. The company headquarters is equipped to provide for administration, supply, messing, and motor maintenance.

44%. ORGANIZATION.—The signal repair company is composed of a company headquarters, 10 radio repair sections, and 5 wire repair sections. The operating unit of the company is the repair section.

a. Company headquarters.—(1) The company headquarters performs all the duties incident to the administration, supply, messing, and first and second echelon motor maintenance of the company. It consists of the company commander, five lieutenants, first sergeant, mess sergeant, cooks, supply sergeant, clerks, motor sergeant, automobile mechanics, and a basic private for general utility. The lieutenants are assigned to repair sections by the company commander.

(2) The company commander advises the signal officer or signal depot commander concerning the operations of his company. He supervises the establishment and operation of the repair sections and determines the priority of repairs within limits prescribed by the signal officer or signal depot commander. He will require each repair section to keep such records as may be necessary to enable it to take timely steps to replace consumed spare parts and repair materials and keep him informed of work that is being done, of abuses to equipment which have been discovered, and of faults which

op in equipment. He renders the necessary reports and recommends to higher authority action to be taken for the preservation of signal equipment. He develops standard procedure for repairs and suitable spare parts lists for his section, and arranges for the distribution of technical manuals and instruction books.

Radio repair section.—The radio repair section consists of chauffeur, radio electricians, and basic private. Its mobile repair shop is equipped with the necessary tools, spare parts, and technical instructions for testing and repairing all field radio equipment. The list of spare parts provided to the section will vary according to the types of radio equipment in the unit with which it will operate. It corrects deficiencies in radio equipment by repair or replacement of faulty equipment, or disposes of those items which are not repairable as may be directed in standing instructions. If in making repairs it discovers evidence of abuses to or common faults in equipment, such evidence should be called to the attention of the company commander. It is responsible that spare parts or replacement units are kept on hand in sufficient quantities to permit prompt and effective repairs of radio equipment.

Wire repair section.—The wire repair section consists of telephone electricians, teletypemen, chauffeur, and basic private. This section is equipped to repair all telephone, telegraph, and telegraph printer equipment. It carries spare parts appropriate to equipment of the unit with which it operates. It corrects deficiencies in telephone, telegraph, and telegraph printer equipment by replacement or repair, or disposes of those items which are not repairable as may be directed in standing instructions. It is responsible for rendering evidence of abuse to or faults in equipment to the company commander and for keeping itself provided with adequate spare parts and repair materials.

478. OPERATIONS.—*a. General.*—The signal repair company operates directly under the unit signal officer or under the signal depot commander from one location or from several locations. Under exceptional conditions for limited periods

SIGNAL CORPS FIELD MANUAL

me, sections may be attached to divisions or units of army s or field army troops. When more than one signal t is established by a signal depot company, one or more ons of a signal repair company will usually be attached ach depot at which there is no repair section of the signal t company. Correction of deficiencies in equipment er by repair or replacement should be completed within ours as a maximum time, and ordinarily within a much ter period. Faulty equipment which has been replaced hich cannot be repaired by the signal repair company be sent to a field army signal depot or similar installa- for repair and return to stock, or for other appropriate on. The functions of the signal repair company are not nded to replace the regular supply system between units a signal depot, but are intended to provide prompt emer- cy repair or replacement when needed. The signal re- company does not relieve organizations of the responsi- ty for maintenance of their own signal equipment within capabilities of authorized maintenance personnel and ipment.

Location.—Signal repair sections operating with divi- s, army corps troops, or field army troops are preferably ted at the signal supply points pertaining to those units. h locations facilitate coordination of the flow of items repair to and from the signal repair section with the nal supply officer of the appropriate unit. The signal air section is as mobile as any unit with which it may rate. It moves whenever the supply point of the unit ves.

Channels of repair.—A signal repair section is prepared repair equipment of the proper types which may be brought t through the signal supply channels of the unit with hich it operates and to return the repaired equipment ough the same channels. In addition, it is prepared to d a repairman with a set of repair tools to the equipment rder to adjust or repair equipment while it is in operation, with a minimum loss of time from operation. Examples equipment which would be repaired preferably by sending

SIGNAL CORPS FIELD MANUAL

repairman to it rather than by moving the equipment the repair shop are telegraph printer machines, and telephone switchboards of the types used at headquarters of army corps and field armies. It will be necessary in some cases to move the whole repair shop to the site of the equipment to be repaired.

References.—Signal repair is closely associated with the operation of the signal supply system which is described in T/O 11-5. The organization of the signal repair company is prescribed in T/O 11-127. The equipment of the company is governed by Signal Corps Table of Basic Allowances No. 11.

[A. G. 062.11 (4-24-41).] (C 1, June 12, 1941.)

Section VII, chapter 3, is renumbered section VIII.

[This page is glued to Page 5 which precedes it]

army is acting independently, or if no command post has been prescribed for it by superior authority, it will be decided upon and announced by the army commander. While the army command post should be near enough to the front to facilitate signal communication with and control of subordinate units for a considerable period of time in case of a successful advance, yet it should not be so close to the front that its movement to the rear would be required by local reverses. The length of time required to establish the army signal system and its broad extent demand that the command post be moved no more often than required for proper control of the tactical operations of subordinate units. No hard and fast rule can be prescribed for the distances at which the army command post should be located in rear of the front line.

c. Corps.—Usually when the corps is part of an army the army prescribes the location of the corps command post and its axis of signal communication. Considerations affecting the selection of corps command posts are covered in paragraph 20.

■ 97. AGENCIES.—Signal agencies employed in an army system are indicated below. Those mentioned in *a*, *b*, *c*, and *d* below are fully covered in paragraphs 44 to 47 of this manual and in FM 11-5, and are not further discussed in this manual.

- a.* Signal supply.
- b.* Signal intelligence service.
- c.* Photographic.
- d.* Training.
- e.* Signal communication.
 - (1) Message centers.
 - (2) Messenger communication.
 - (3) Pigeon communication.
 - (4) Radio communication.
 - (5) Visual communication.
 - (6) Sound communication.
 - (7) Wire communication.

■ 98. MESSAGE CENTERS.—Message centers are established at the army command post and rear echelon as a matter of

routine. However, there will be throughout the army area numerous and widely dispersed administrative establishments for supply, evacuation, sanitation, traffic control, military government, etc., some of which may be grouped in particular localities. In the interests of efficiency it may be desirable to set up other message centers in such localities. The location of each of these message centers is dependent on its proximity to commercial or previously established military telephone, telegraph, or messenger systems, to which it may be connected with a minimum of construction or effort. Established commercial telephone centrals or telegraph offices provide ideal locations. These message centers consist of message center personnel, messengers for the routine collection and delivery of messages, and operating personnel for the other signal means employed by it.

■ 99. MESSENGER COMMUNICATION.—*a.* Within the limits of available personnel and transportation, local, special, and scheduled messengers are employed between the command post, rear echelon, and other message centers of the army as required.

b. In an emergency, or if considerations of time make it necessary, airplane messengers if available are employed.

■ 100. PIGEON COMMUNICATION.—For the employment of pigeon communication, and units furnishing the same, see paragraphs 57 to 63 and FM 11-5.

■ 101. RADIO COMMUNICATION.—*a. General.*—Radio communication in the army with the exception of that of army aviation, attached aviation, and attached cavalry units is essentially an emergency means of signal communication. Being the only means usually available with and between the excepted forces, it is their primary means. In all other units radio communication is used pending the establishment of other means, to supplement other means, or to supplant them in case of failure. As soon as wire communication can be established between units, radio communication if not required to supplement it is restricted or discontinued. The radio operators are employed as telegraph operators, but the radio sets are kept in readiness to resume operation when necessary.

b. The army may be required to operate a special services radio station for the transmission of time signals, press reports, and counterpropaganda, and to control the operation of commercial and private radio stations in its area. These radio functions of the army are covered in FM 11-5.

c. *Nets*.—Figure 26 shows the nets which may be established in an army system. It should not be considered as

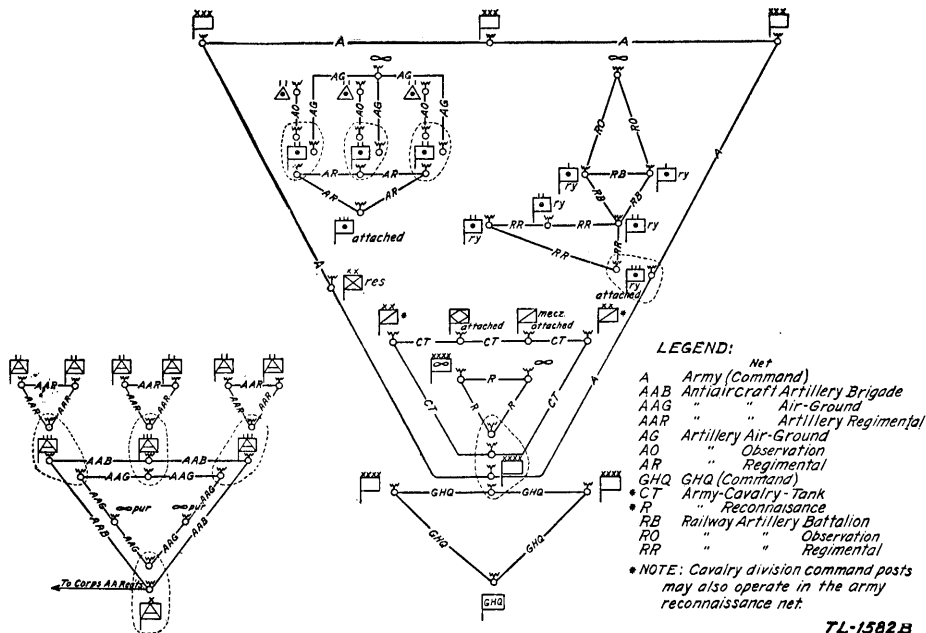


FIGURE 26.—Army radio nets.

indicating the only nets which may be organized, or the only stations which may be placed in the nets. Whenever the situation demands and when suitable sets and frequencies are available, the army commander reorganizes his existing nets, or organizes new nets to meet his requirements for radio communication.

(1) The command net (A) includes the command posts of the army, the corps, the attached railway unit, and, if the army reserve is a division or other unit issued a suitable set, the command post of the army reserve.

(2) The reconnaissance net (R) includes the command posts of the army, army aviation, attached cavalry, and individual aircraft. It may include the airdromes from which aircraft operate.

(3) The army-cavalry-tank net (CT) includes the command posts of the army, attached cavalry (horse and mechanized), and attached tanks.

(4) The antiaircraft net (AAB) includes the command posts of the coast artillery brigade (AA) and its regiments. Included within the brigade are the normal regimental (AAR) and air-ground (AAG) nets.

(5) The nets included within attached cavalry, artillery, railway artillery, and other units are normal and do not differ from those of similar units employed elsewhere.

■ 102. VISUAL COMMUNICATION.—Panels are usually the only means of visual communication used in the army system. They are used at the army command post, the command posts of attached army artillery, and other units for communication with airplanes in flight.

■ 103. SOUND COMMUNICATION.—Sound communication is usually employed in the army system only as a gas, air, or mechanized attack alarm.

■ 104. WIRE COMMUNICATION.—Wire communication is the primary means of signal communication for the bulk of the units of the army. In addition to the normal wire system for command and administrative purposes, the army may be required to install or to assist in the installation and operation of an extensive wire system for the aircraft warning service

and other special organizations which operate in the army area or which may be attached to the army by GHQ. These special systems, in the case of the aircraft warning service, provide for connection between numerous observation posts and information centers (see par. 147), as well as between various headquarters and other establishments. The wire system of the army includes wire lines, telephone, telegraph, and telegraph printer operating and maintenance equipment, and may also include carrier systems and facsimile transmission. For details, see FM 11-5.

■ 105. WIRE TRAFFIC.—Wire traffic considerations for the army are identical to those of the corps and are covered in detail in paragraph 32.

■ 106. TELEPHONE REQUIREMENTS.—Since the telephone with its equipment is more extensive and elaborate than the telegraph, and since military telegraph circuits are usually superimposed on telephone trunk circuits, the telephone forms the basis of the wire system. The minimum requirements tabulated in *a* and *b* below are estimates for use as a guide only. The number of telephones, local circuits, trunk circuits, and telegraph channels installed and operated depend upon the requirements of the situation, the existing wire facilities available, the orders of the commander, the time, equipment, and supplies available, and the capabilities of the signal personnel assigned to army headquarters.

a. Local circuits and telephones.—Indicated below are the minimum requirements for the army headquarters. In prolonged operations the army headquarters may be expected to expand, in which case the telephone requirements will increase proportionately. One telephone is installed in each local circuit, and the extension telephones indicated are installed in addition on the local circuits.

Office or activity	Local circuits	Extension tele-phones	Total tele-phones
<i>Forward echelon</i>			
Army commander	1	2	3
Aides	1		1
Chief of staff	2	2	4
G-1 section	2	1	3
G-2 section	3	1	4
G-3 section	3	1	4
G-4 section	2	1	3
Field artillery section	2	1	3
Coast artillery section	2	1	3
Engineer section	2	2	4
Aviation section	2	2	4
Signal section	3	3	6
Chemical warfare section	1		1
Message center	3	3	6
Telephone central	3		3
Telegraph station	3		3
Radio stations	2		2
Public telephones	4		4
Miscellaneous	15		15
Total forward echelon	56	20	76
<i>Rear echelon</i>			
Adjutant general's section	3	2	5
Inspector general's section	1	1	2
Quartermaster section	6		6
Judge advocate's section	1		1
Finance section	1		1
Chemical warfare section	1	1	2
Chaplain's section	1		1
Ordnance section	2	2	4
Medical section	4	4	8
Message center	3	1	4
Telegraph station	3		3
Telephone central	3		3
Radio station	2		2
Public telephones	4		4
Miscellaneous	15		15
Total rear echelon	50	11	61

b. Trunk circuits and telegraph circuits.

Unit to which connected	Trunk circuits	Telegraph circuits
<i>Forward echelon</i>		
Corps (4 each for 3 corps).....	12	6
Antiaircraft artillery brigade.....	3	3
General service engineer regiments (2 each for 3 regiments).....	6	-----
Squadron, aviation reconnaissance (trunk or local).....	2	1
Radio intelligence company.....	2	-----
Army reserve (3 each for each division).....	3	-----
Military police battalion.....	1	-----
Chemical field laboratory.....	1	-----
Chemical decontamination companies (1 each for each company).....	3	-----
Quartermaster car company.....	1	-----
Adjacent armies (3 each for each flank).....	6	3
Rear echelon.....	4	2
Army group or GHQ.....	6	3
Attached field and railway artillery.....	4	2
Attached cavalry.....	3	3
Attached aviation.....	6	3
Attached tanks.....	2	1
Commercial systems.....	4	-----
Landing fields.....	12	12
Air defense.....	2	2
Total forward echelon.....	83	41
<i>Rear echelon</i>		
Medical regiments (2 each for 3 regiments—trunks or local circuits).....	6	-----
Hospital groups.....	9	-----
Railheads (corps and division).....	6	6
Depots (trunks or local circuits).....	10	-----
Engineer topographic, camouflage, and shop companies (trunks or local circuits).....	3	-----
Engineer separate battalions.....	6	-----
Quartermaster maintenance, and gasoline supply battalions (trunks or local circuits).....	3	-----
Quartermaster truck regiment.....	3	-----
Pigeon and photographic companies (trunk or local circuits).....	2	-----
Ordnance maintenance companies (trunk or local circuits).....	3	-----
Ammunition supply points.....	6	6
Railroad passenger and freight stations, yards, offices, etc.....	10	-----
Commercial systems.....	8	-----
Army group or GHQ.....	4	2
Landing fields.....	6	-----
Total rear echelon.....	85	14

c. Centrals.—Where commercial centrals are not available or are inadequate, telephone centrals utilizing standard military universal switchboards (local and common battery) and associated equipment are installed at the army command post, army rear echelon, and switching centrals as required. For switchboards and other items generally comprising an army central, see FM 11-5.

■ 107. TELEGRAPH REQUIREMENTS.—**a. Circuits.**—Telegraph circuits (par. 106) are obtained by superimposing them upon telephone trunk circuits.

b. Stations.—Based upon a study of traffic requirements, and within the limitations of available equipment and personnel, manual telegraph sets and telegraph printers are installed and operated so as to render telegraph communication most rapid and efficient. The approximate rates of message transmission and the capabilities and limitations of these installations are given in FM 11-5. Subject to the limitations mentioned therein and above, consideration is always given to the employment of telegraph printers—

(1) For general use between the army command post and the army group or GHQ, army rear echelon, and corps in the army; between the army rear echelon, army railheads, army supply points, and the army group or GHQ.

(2) For direct communication between the army G-3 section and the G-3 section of army group or GHQ.

(3) For direct communication between the army G-3 section and the G-3 sections of the corps of the army.

c. Switchboards.—Switchboard considerations for telegraph for the army are the same as those for the corps. (See par. 34c.)

■ 108. CARRIER REQUIREMENTS AND POWER SUPPLY.—(See pars. 35 and 36.) While the use of a central power supply source for signal purposes (par. 36) is not considered justified within the corps in most cases, it may prove quite desirable for the army signal establishment.

CHAPTER 4

THEATER OF OPERATIONS AND GHQ

	Paragraphs
SECTION I. Organization.....	109-110
II. Headquarters GHQ signal service.....	111-120
III. Construction battalion.....	121-127
IV. Signal laboratory, photographic.....	128-134
V. GHQ aviation signal service.....	135-146
VI. Aircraft warning service.....	147
VII. Signal communication in theater of operations..	148-152

SECTION I

ORGANIZATION

■ 109. ORGANIZATION.—Based upon political and strategical considerations, and the consequent objectives of the national war effort, war and mobilization plans provide for the organization of the field forces, and for their employment in the theater of war, in one or more theaters of operations. For complete information on the territorial organization of the theater of war, and on the administrative system and procedures, see FM 100-10 and FM 100-15. For a brief outline of administrative procedures affecting the Signal Corps, see FM 11-5.

■ 110. FIELD FORCES.—The field forces consist of a general headquarters (GHQ) and the troops and the installations comprising one or more theaters of operations.

a. *GHQ*.—The headquarters of the commander of the field forces is the general headquarters (GHQ). GHQ exercises control over all theaters of operations, specifying, regulating, and coordinating the operations therein in accordance with the general policies prescribed by the President and under the general direction of the Secretary of War.

(1) *GHQ signal service*.—The GHQ signal service comprises the signal corps organizations assigned to GHQ. A headquarters, GHQ signal service, and varying numbers of signal corps units of various types are assigned to this signal service depending upon the signal requirements. A possible or type organization of the GHQ signal service is illustrated

in figure 27. The headquarters, GHQ signal service; the construction battalion; the signal laboratory, photographic; and the aircraft warning service are covered in subsequent sections of this chapter. Other units which may be assigned to the GHQ signal service are identical to those assigned to corps and army and are covered in previous chapters of this manual.

(2) *GHQ aviation*.—The GHQ aviation includes all aviation not otherwise specifically assigned and constitutes a pool of combat, reconnaissance, and transport aviation which provides forces for the conduct of offensive and defensive operations along functional lines (FM 100-15). (GHQ aviation includes a signal service which is covered in sec. V.)

(3) *GHQ reserve*.—The GHQ reserve is composed of troops of the various arms and services not habitually required by an army in the field, but which are held for use as reinforcements or for separate missions under GHQ. The GHQ reserve may include any and all kinds of signal corps units. When a new theater of operations is established, signal corps units for assignment to the signal service of the theater headquarters (THQ) are drawn from this reserve.

b. Headquarters, theater of operations (THQ).—(1) Within a theater of operations the theater commander directs the operations of all troops in the theater. The organization and composition of headquarters, theater of operations, will vary depending upon its location with respect to sources of supply and other factors, but will always include both a general and special staff, together with such troops as are necessary to assist the commander and his staff in the performance of their functions. When operations are conducted in only one theater, theater headquarters is GHQ.

(2) *Theater signal service*.—To the headquarters of each theater of operations not identical with GHQ will be assigned signal corps units comprising the signal service of that headquarters. The number and type of these signal corps units will vary with the signal situation in the theater but will resemble the organization of the GHQ signal service shown in figure 27. The operations of those signal corps units not habitually assigned to an army are discussed herein from the viewpoint of their assignment to a particular theater of operations.

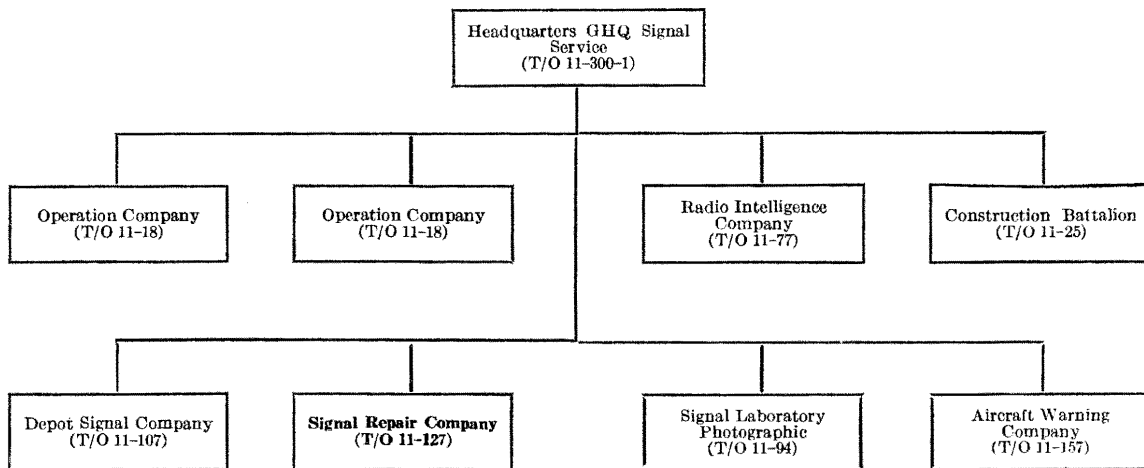


FIGURE 27.—Organization of type GHQ signal service.

[A. G. 062.11 (4-24-41).] (C J. June 12, 1941.)

SECTION II

HEADQUARTERS, GHQ SIGNAL SERVICE

■ 111. GENERAL.—*a.* The headquarters, GHQ signal service, is the office of the chief signal officer of GHQ. All of its operations and those of its subdivisions are accomplished by his direction and under his direct control. A similar organization may be required in each theater of operations not identical with GHQ.

b. A chief signal officer commands all signal corps units assigned or attached to the signal service of GHQ or the headquarters of a theater of operations (THQ) as the case may be. He is provided with a headquarters, signal service, which assists him in performing both his command and staff functions. (See FM 11-5.)

c. Subject to such other instructions as may be issued by a chief signal officer, the operations of the various subdivisions of the headquarters are as indicated in paragraphs 113 to 120 inclusive. In many respects these operations are similar to those of the headquarters, army signal service, within the army headquarters, as outlined in chapter 3. These similarities and important differences are shown in the indicated paragraphs. The personnel in each subdivision of this headquarters, however, are slightly larger than that in the corresponding subdivisions of the headquarters, army signal service.

d. Training, supply, photographic, signal intelligence service, and signal communication functions of the Signal Corps are completely covered in FM 11-5.

e. In addition to the contacts maintained by subdivisions as indicated separately for each, this headquarters maintains close contact with the commanders of units of the signal service, and with the signal officers of both subordinate and superior command echelons.

■ 112. TRANSPORTATION.—Transportation required by GHQ or THQ signal services is obtained from a headquarters transportation pool.

■ 113. ORGANIZATION.—The organization of the headquarters, GHQ signal service, is covered in T/O 11-300-1. It com-

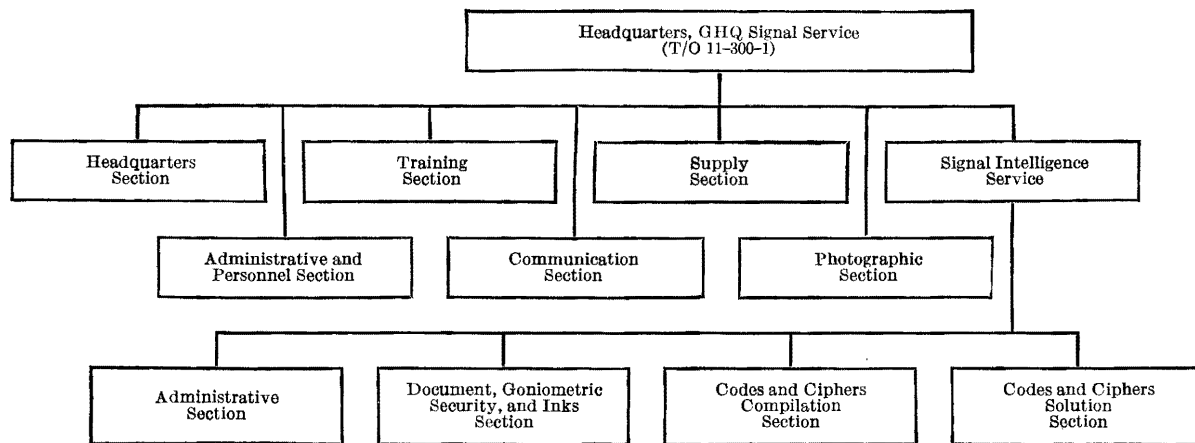


FIGURE 28.—Organization of headquarters, GHQ signal service.

prises six sections and a signal intelligence service as shown in figure 28.

■ **114. HEADQUARTERS SECTION.**—The headquarters section consists of the chief signal officer and officer and enlisted assistants. It operates in a manner similar to the corresponding section of the army signal service, except—

a. This section utilizes its additional personnel for the administration and messing of the entire headquarters, while in the army signal service the headquarters is attached to one of the units of the army signal service or other unit for these purposes.

b. The photographic duties performed in the army signal service by the headquarters section are performed in the GHQ signal service by the photographic section. (See par. 119.)

■ **115. ADMINISTRATIVE AND PERSONNEL SECTION.**—There are no important differences between the operations of the administrative and personnel section of this headquarters and those of the corresponding section of the army signal service.

■ **116. TRAINING SECTION.**—There are no important differences between the operations of the training section of this headquarters and those of the corresponding section of the army signal service except that, since a pigeon company is seldom included in the GHQ signal service, the section is relieved of supervising the training of that organization.

■ **117. SUPPLY SECTION.**—Except for magnitude, there are no important differences between the operations of the supply section of this headquarters and those of the corresponding section of the army signal service.

■ **118. COMMUNICATIONS SECTION.**—The operations of the communications section are similar to those of the corresponding section of the army signal service, except this section recommends and supervises the employment of the operation companies and one or more construction battalions instead of the two signal battalions and the pigeon company as in the army signal service.

■ **119. PHOTOGRAPHIC SECTION.**—The photographic section, consisting of the section chief and enlisted clerical assistants, is charged with the handling of all matters regarding signal corps photographic activities. Among other matters it—

a. Recommends and supervises the establishment of photographic laboratories and the employment of such laboratories and of any photographic units included in the signal service.

b. Investigates the necessity for and recommends the preparation of training or other films and supervises their preparation.

c. Recommends the special employment of photographic units of armies.

d. Maintains close contact with G-2 and G-3, GHQ or THQ, as the case may be.

■ **120. SIGNAL INTELLIGENCE SERVICE.**—The operations of the signal intelligence service are similar to those of the corresponding service of the army signal service, except—

a. This service utilizes its codes and ciphers compilation section for the preparation and distribution of codes and ciphers for general use throughout the theater of operations.

b. The operations of the document, goniometric, security, and inks section of this service combine, and have a wider scope than the operations of the goniometric identification and communication security sections of the army signal service.

c. Recommendations for the establishment of special service radio stations and the obtaining of information for the control of civil radio stations are made by this service through the signal officer to the G-2 section of the general staff. It utilizes the radio intelligence company in the latter activity.

SECTION III

CONSTRUCTION BATTALION

■ **121. COMMAND.**—*a.* The construction battalion, commanded by a lieutenant colonel or major, is an organic part of the GHQ signal service and is usually required in the signal service of each theater.

b. The battalion commander is responsible for the administration, discipline, training, and operations of the battalion.

■ 122. DUTIES.—The duties of the construction battalion are the construction of wire lines, including field, open wire, and cable, and the rehabilitation and maintenance of such wire lines, including those constructed by the military forces and those taken over by them. Although not primarily organized for the purpose, it may also be used to assist other signal corps units in wire construction, within its capabilities.

■ 123. EQUIPMENT, SUPPLIES, AND TRANSPORTATION.—The following principal items, in sufficient quantities to permit its effective operation, are authorized for the construction battalion by Tables of Basic Allowances for Signal Corps:

a. Drafting and duplicating equipment.

b. Command trucks; cargo trailers; cargo, reconnaissance, pick-up, and panel delivery trucks; and special purpose vehicles, including telephone construction and earth borer trucks of special design.

c. Wire and wire construction, operation, and maintenance equipment and supplies, including tools, testing equipment, etc.

■ 124. ORGANIZATION.—The construction battalion is shown in T/O 11-25 and is composed of a headquarters and headquarters company, two construction companies, and attached medical personnel. The organization is shown in figure 29.

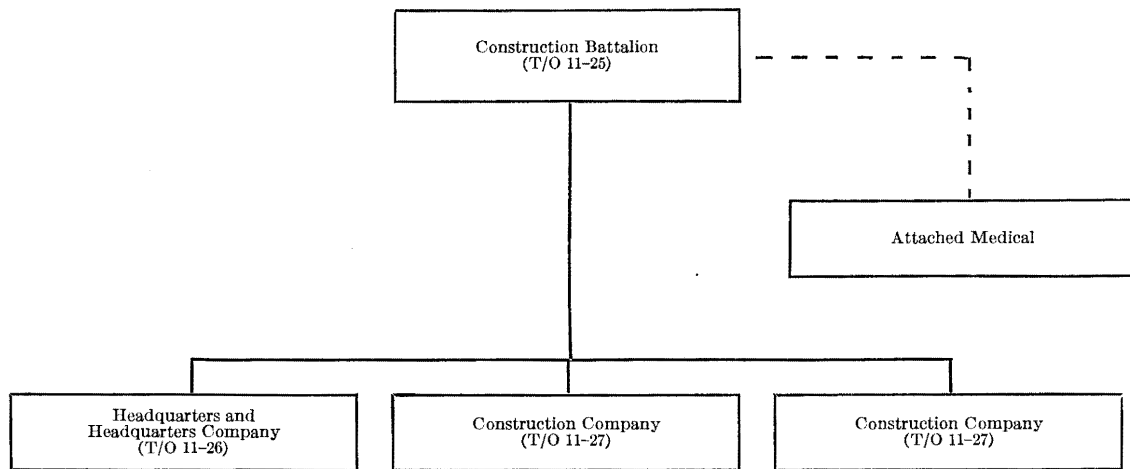


FIGURE 29.—Organization of construction battalion.

■ 125. HEADQUARTERS AND HEADQUARTERS COMPANY.—*a. Organization.*—The organization of the headquarters and headquarters company is shown in figure 30.

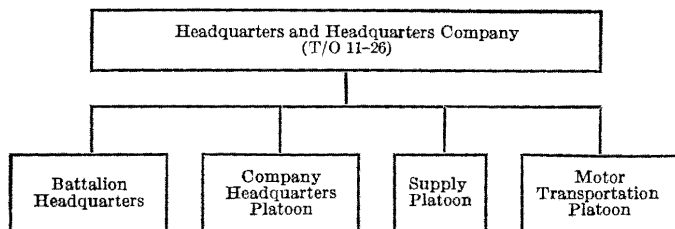


FIGURE 30.—Organization of headquarters and headquarters company, construction battalion.

b. Operations.—(1) *Battalion headquarters.*—The battalion headquarters consisting of the battalion commander, the battalion adjutant, the battalion sergeant major, the battalion supply sergeant, headquarters clerks, and a draftsman assigns missions to the battalion and its companies, administers the battalion, and supervises its operations.

(2) *Company headquarters platoon.*—The company headquarters platoon consists of the company commander, the first sergeant, the mess sergeant, headquarters clerks, cooks, and basic privates. It operates the mess and performs the administrative functions of the company other than supply.

(3) *Supply platoon.*—The supply platoon consists of the platoon commander, the supply sergeant, a headquarters clerk, a mechanic, and basic privates. It operates the supply agency for this company and the entire battalion. The platoon commander is also the battalion supply officer, operating in that capacity directly under the battalion commander.

(4) *Motor transportation platoon.*—The motor transportation platoon consisting of the platoon commander, truckmaster and assistants, automobile electricians, mechanics, chauffeurs, and a headquarters clerk operates, maintains, and accomplishes the unit repair of the motor vehicles assigned to the entire battalion. The platoon commander is the battalion transportation officer, operating the battalion trans-

portation pool directly under the battalion commander. The construction companies of the battalion are not issued any transportation but obtain all that is required from the battalion pool. Chauffeurs of all vehicles come from this platoon and operate under the command of the transportation officer unless attached by the battalion commander to one of the construction companies, in which case they come under the command of the commander thereof. The transportation officer cooperates with the commanders of the construction companies in the allotment of vehicles, and in the operation of the vehicles so as to assure those commanders of adequate and efficient transportation as they need it.

■ 126. CONSTRUCTION COMPANY.—The organization and operations of the two construction companies of this battalion are identical with those of the construction company of the signal battalion. (See par. 15.)

■ 127. CONSTRUCTION COMPANY, SEPARATE.—In order to provide a smaller construction unit than a battalion, there is authorized a signal company, construction, separate, the organization of which is prescribed in T/O 11-27. It is similar to construction companies in the construction battalion except that it is provided with its own organic transportation.

SECTION IV

SIGNAL LABORATORY, PHOTOGRAPHIC

■ 128. COMMAND.—*a.* The signal laboratory, photographic, commanded by a lieutenant colonel, will frequently be a part of the GHQ signal service, and is usually included in the signal service of each theater of operations.

b. The laboratory commander is responsible for the administration, discipline, training, and operations of the laboratory.

■ 129. DUTIES.—The organization of the laboratory contemplates its operation as a central photographic laboratory and production organization. The photographic function of the Signal Corps is completely covered in FM 11-5. Photographic units for field work are included in the laboratory and may be attached to subordinate units. One or more branch still

picture laboratories and one or more branch motion picture laboratories may be established by this organization. Because of the nature of its equipment and the physical volume of its work, the laboratory is not highly mobile, and efficient operation will necessitate the availability of suitable buildings and other utilities for its use. Consequently, its location should be such that frequent moves are not necessary. The duties of the laboratory are the establishment and operation of one or more still and motion picture laboratories in which are performed—

a. The production of identification photographs, passport photographs, and similar work.

b. The production of various types of still pictures.

c. The maintenance of the central negative and print files and related records for all signal corps photographic agencies in the theaters of operations.

d. The production of complete motion pictures of required classes.

e. The maintenance of the central files for motion picture negatives, prints, and circulation prints with records.

f. The development and printing of sufficient copies to permit censorship by G-2 of all photographic negatives taken by official or accredited civilian photographers. (See FM 30-25.)

g. The development, printing, and editing of motion picture material exposed by all motion picture assignment units, including those from photographic companies.

h. The operation of an assembling and forwarding agency for signal corps photographic work originating in theaters of operations and destined for the zone of the interior.

i. The operation of a repair service for the repair of cameras, recorders, and related photographic equipment for all signal corps photographic agencies.

■ **130. EQUIPMENT, SUPPLIES, AND TRANSPORTATION.**—The following principal items in sufficient quantities to permit its effective operation are authorized for the laboratory by Tables of Basic Allowances for Signal Corps:

a. Still cameras with accessories of the several types and sizes required.

b. Still negatives and papers in several sizes, types, and grades.

c. Chemicals, laboratory supplies, and materials for still pictures.

d. Laboratory equipment for the development of negatives, printing, copying, enlarging, reducing, and drying of still pictures.

e. Motion picture cameras, recorders, and power equipments with related accessories.

f. Chemicals, laboratory supplies, and materials for motion picture processing and finishing.

g. Motion picture laboratory equipment, including developing machines, printers, edge numbering machines, sensitometers, densitometers, motor generators, etc., necessary to operate a complete motion picture laboratory as a semifixed installation, as well as the mobile motion picture laboratories.

h. Sound re-recording equipment.

i. Motion picture editing, filing, and projection equipment and supplies.

j. Power supply and lighting equipment.

k. Equipment and supplies to operate a repair service on photographic and sound recording equipment.

l. Typewriters, office equipment, and supplies necessary to produce captions for still pictures and maintain records of all photographic work.

m. Cargo and especially equipped trucks and reconnaissance and passenger cars.

n. Such additional special equipment as is required to perform its photographic mission.

■ 131. ORGANIZATION.—The signal laboratory, photographic, is shown in T/O 11-94 and is composed of an administrative and supply section, a still picture department, and a motion picture department. The organization is shown in figure 31.

■ 132. ADMINISTRATIVE AND SUPPLY SECTION.—The administrative and supply section consisting of the laboratory commander, officer assistants, and enlisted clerical, administrative, chauffeur, and electrician assistants administers the laboratory, operates the mess and the supply agency therefor, assigns missions to the laboratory, and supervises its operations.

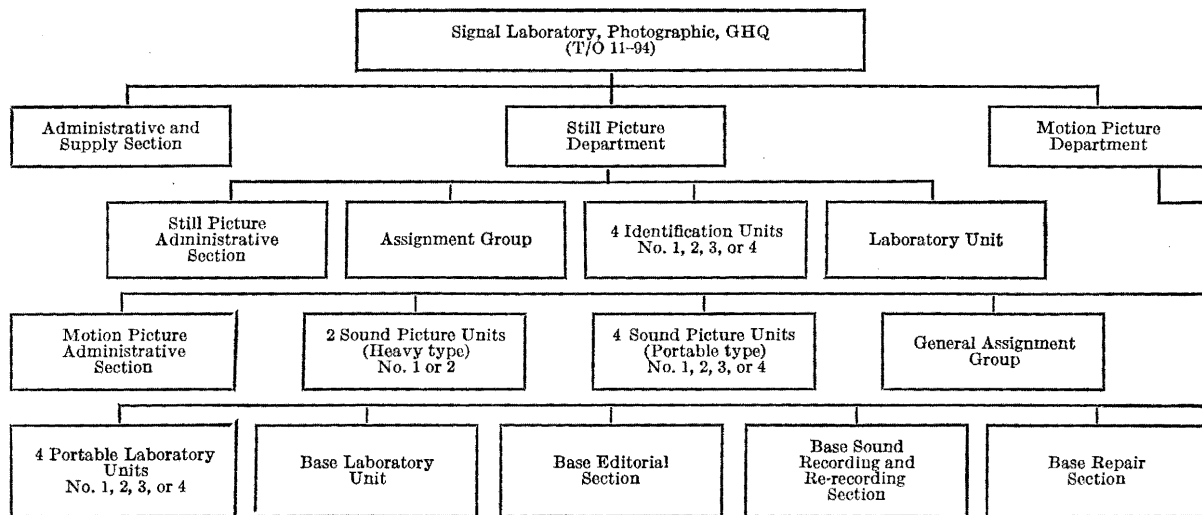


FIGURE 31.—Organization of signal laboratory, photographic.

■ 133. STILL PICTURE DEPARTMENT.—The still picture department is organized into a still picture administrative section, an assignment group, four identification units, and a laboratory unit. One officer is in general charge of the assignment group and the four identification units.

a. The still picture administrative section, consisting of the officer in charge of the department as well as of this section, and enlisted clerical assistants, handles the assignment of all units and elements; directs the operations of the laboratory unit; and acts as a clearing house in the disposition of all completed work. It is responsible for the efficient administration and production of all still picture activities and work.

b. The assignment group consisting of enlisted chauffeurs and still cameramen serves as a pool of still picture cameramen for dispatch on various missions, and its personnel are concerned with the planning and execution of those missions. Normally, personnel of this group are responsible only for exposure of negatives and the preparation of adequate captions.

c. Each of the four identification units consisting of an enlisted chauffeur, a still cameraman, a photographer, a developer, and a printer produces identification photographs with cards, passport photographs, and similar work. It is organized and equipped to perform its functions independently of the central laboratory, and is generally moved about among the lower commands to carry out its mission.

d. The laboratory unit consisting of the officer in charge of the unit, an officer assistant, and various enlisted laboratory assistants performs the laboratory functions of negative development, printing, enlarging, copying, duplication of captions, and maintenance of negative and print files and records. It is organized to operate 24 hours a day if necessary to provide prompt service. In some situations it may be required to operate one or more branch laboratories to facilitate the service.

■ 134. MOTION PICTURE DEPARTMENT.—The motion picture department is organized into a motion picture administrative section, two heavy type sound picture units, four portable type sound picture units, a general assignment group, four portable laboratory units, a base laboratory unit, a base editorial

section, a base sound recording and re-recording section, and a base repair section.

a. The motion picture administrative section consisting of the officer in charge of the department as well as of this section, an officer assistant, and enlisted clerical and chauffeur assistants is responsible for the efficient operation of all motion picture activities. It handles the assignment of motion picture units, directs the operation of the motion picture laboratory unit, the base editorial, the base sound recording and re-recording, and the base repair sections.

b. Each of the two heavy type sound picture units consisting of the officer in charge of the unit, an officer assistant, and enlisted cameramen, electricians, chauffeurs, and sound recordists performs production work on training films and similar work, either in the field or indoors. Each is equipped with studio type recorders in trucks, portable power and lighting equipment, and all accessories necessary to undertake the more difficult types of work. Of the two officers in each unit, one is the production director and the other is the director of photography.

c. Each of the four portable type sound picture units consisting of the officer in charge of the unit and enlisted cameramen, chauffeurs, and a sound recordist performs field work on sound motion picture production. The sound recording equipment of each is of the portable or semiportable type and it carries a small amount of auxiliary lighting equipment but no power truck for lighting use. Each unit is used to cover events or activities where natural sound recordings are required and, while primarily designed for public information and record type work, may be used on other types of work.

d. The general assignment group consisting of enlisted cameramen and chauffeurs is a pool of motion picture cameramen and assistants equipped with silent type camera equipment. This group provides sufficient personnel and equipment to form several small units for dispatch on missions where natural sound recordings are not required. They may be used independently to supplement the sound picture units, or as additional units to augment photographic companies temporarily.

e. The portable laboratory units, each consisting of the officer in charge of the unit and various enlisted laboratory assistants, perform motion picture development and printing away from the base plant. It is mobile and intended for use in advanced areas whenever need arises for prompt development and printing of films for use in forward areas. Because its capacity is limited, it should not be expected to process all negatives originating at the front, and its work should be restricted to negatives in the urgent category. In order to perform such missions efficiently, it may be augmented by the attachment of a small editorial group. When used in advanced areas, it is normally attached to a photographic company and does not operate directly with units below those at an army headquarters.

f. The base laboratory unit consisting of the officer in charge of the unit and various enlisted laboratory assistants performs a large volume of laboratory work, including negative development, printing, copying, and optical reduction work. It is organized to operate 24 hours a day to provide prompt service. It performs all work of special photographic nature such as miniature and matte shots, process, background, and trick photography, as well as title, montage, and insert production. It prepares and executes animation work as directed by the editorial section. It maintains the negative and print files, and it assists the base editorial section in maintaining the records pertaining thereto.

g. The base editorial section consisting of the officer in charge of the section, officer assistants, and various enlisted assistants prepares scenarios on approved projects and performs the editorial work on all classes of films. It is responsible for the direction of sound recordings and re-recordings performed in connection with completed projects. It plans the production of titles and animation work, and is responsible for the completion of all of the creative tasks on films. It maintains the records of all completed and incomplete projects as well as the caption records of all scenes passing through the laboratory. In some exceptional situations, editorial personnel may be attached to field units or to the portable laboratory unit for temporary periods.

h. The base sound recording and re-recording section consisting of the officer in charge of the section, an officer assistant, and various enlisted assistants performs studio sound recordings and re-recordings as required by the editorial section. It maintains the library of sound effects recordings and from these prepares necessary sound effects used in conjunction with the original sound track for re-recording. The officer in charge acts as a technical adviser to the editorial section as well as to all other units engaged in the recording of sound.

i. The base repair section consisting of the officer in charge of the section and various enlisted assistants performs the repair and maintenance work for all elements of the laboratory and all repair work on photographic and sound equipment in the theater of operations. It services and maintains the motor vehicles of the organization, including the installed electrical and photographic equipment.

SECTION V

GHQ AVIATION SIGNAL SERVICE

■ 135. COMMAND.—*a.* The signal service, GHQ aviation, comprises—

- (1) A signal section, headquarters, GHQ aviation.
- (2) Signal sections, air division headquarters.
- (3) Signal sections, wing headquarters, GHQ aviation.
- (4) Signal companies (aviation).
- (5) Signal maintenance companies (aviation).
- (6) Signal companies, air wing.
- (7) Signal platoons (air base).

b. (1) A signal company (aviation), assigned to headquarters, GHQ aviation, functions under the signal section, headquarters, GHQ aviation. Accordingly, it comes under the direct command of the GHQ aviation signal officer.

(2) A signal company (aviation) and two signal maintenance companies, aviation, are assigned to each air district and function under the signal officer thereof.

(3) A signal company, air wing, is assigned to each wing headquarters.

(4) Signal platoons (air base) are assigned to temporary or established air bases and come under the direct command of the respective base signal officers.

■ 136. DUTIES.—The duties of the signal service, GHQ aviation, include—

a. Installation, operation, and maintenance of all wire communication at GHQ aviation headquarters, at air district headquarters, at wing headquarters, and at air base headquarters.

b. Recommendations and requests to the signal officer of the major unit to which the GHQ aviation may be attached, or the signal officer of the area from which the GHQ aviation operates, for the construction, leasing, or otherwise providing of wire lines for communication between GHQ aviation headquarters, subordinate headquarters, airdromes, landing fields, air bases, and other agencies not immediately adjacent to each other but pertaining to the GHQ aviation. When some of the wire lines requested follow routes not included in the wire system of the major unit, the signal officer thereof may temporarily turn over the necessary construction units to the GHQ aviation signal officer, who is then responsible for the installation of the designated lines.

c. Maintenance of wire lines established for the GHQ aviation.

d. Installation, operation, and maintenance of radio sets used solely for administrative purposes at GHQ aviation headquarters, headquarters of air district headquarters, and air base headquarters.

e. Installation and operation of a signal supply establishment at each air base for the supply and replacement of signal equipment for all units of the GHQ aviation.

f. Establishment and operation of message centers, and local messenger service at GHQ aviation headquarters, headquarters of air district, wing headquarters, and air base headquarters.

■ 137. EQUIPMENT, SUPPLIES, AND TRANSPORTATION.—The following principal items in sufficient quantities to permit effective operation are authorized for units of the signal service, aviation:

a. Telegraph printers, perforators, reperforators, and accessory equipment and supplies.

b. Telephones, switchboards, and related equipment and supplies.

c. Wire construction and maintenance equipment and supplies, including tools, testing equipment, etc.

d. Radio equipment and supplies.

e. Message center equipment and supplies.

f. Drafting and duplicating equipment.

g. Trucks and trailers, and special purpose vehicles for wire construction, in sufficient numbers to transport all the organizational equipment, personnel, and special supplies required for the accomplishment of the signal mission.

■ 138. ORGANIZATION.—The signal units comprising the GHQ aviation signal service are enumerated in paragraph 135, and their organization is covered in the following paragraphs.

■ 139. SIGNAL SECTION, HEADQUARTERS, GHQ AVIATION.—The signal section headquarters, GHQ aviation, includes the GHQ aviation signal officer, his executive officer, an enlisted wire chief, a draftsman, and a clerk. This section is the office of the GHQ aviation signal officer, and all its operations are accomplished by his direction and under his control. As indicated in FM 11-5 he also commands the signal company, aviation, and the signal maintenance companies assigned to the headquarters, GHQ aviation, and any other signal corps units which may be assigned or attached thereto. He maintains close contact with the staff group of the GHQ aviation headquarters, with air division and wing signal officers, and with the signal officer of the major unit to which the GHQ aviation may be attached, or the signal officer of the area from which the GHQ aviation operates. Transportation required by this section is obtained from the signal company, aviation.

■ 140. SIGNAL SECTIONS OF AIR DISTRICT AND WING HEADQUARTERS.—Each of the signal sections assigned to the headquarters of air districts and wings of the GHQ aviation consists of the signal officer, a wire chief, and other assistants. The duties of each are analogous to those of the GHQ aviation headquarters, signal section. Each of these sections maintains close contact with the staff group of its own head-

quarters and the signal sections of other aviation headquarters, for maximum coordination and efficiency of effort. The signal section of an air district must be prepared to provide a signal section for a task force headquarters organized by an air district commander.

■ **141. SIGNAL COMPANY, AVIATION.**—The signal company, aviation, is divided into a headquarters platoon and an operating platoon. (See fig. 32.)

a. Headquarters platoon.—The headquarters platoon consists of an administration section, and a supply and transportation section, and includes the company commander, a supply and transportation section commander, first sergeant, supply sergeant, truckmaster, mess sergeant, chauffeurs, clerks, cooks, automobile mechanics and electricians, and basic privates. The platoon performs the company administration, supply, messing, operation, and unit maintenance of the vehicles of the company. The duties of the individuals of the platoon are indicated by their designations, and are the same as those similarly designated in other organizations.

b. Operating platoon.—The operating platoon consists of a message center section, a radio section, and a telephone and telegraph section.

(1) The message center section consists of the section commander, a message center chief, an assistant message center chief, clerks, and messengers. It establishes and operates the message center and local messenger service for the headquarters to which the company is assigned.

(2) The radio section consists of a chief, an assistant chief radio operator, and several radio operators. This section establishes, operates, and maintains the administrative radio station at the headquarters to which the company is assigned.

(3) The telephone and telegraph section consists of a section commander, a chief and an assistant chief telegraph printer operator, linemen, installer-repairmen, repeatermen, switchboard installer, telegraph printer operators, and telephone switchboard operators. This section installs, operates, and maintains a telephone central, and the local telephone establishment for the headquarters to which the company is assigned. It connects trunk circuits into the telephone cen-

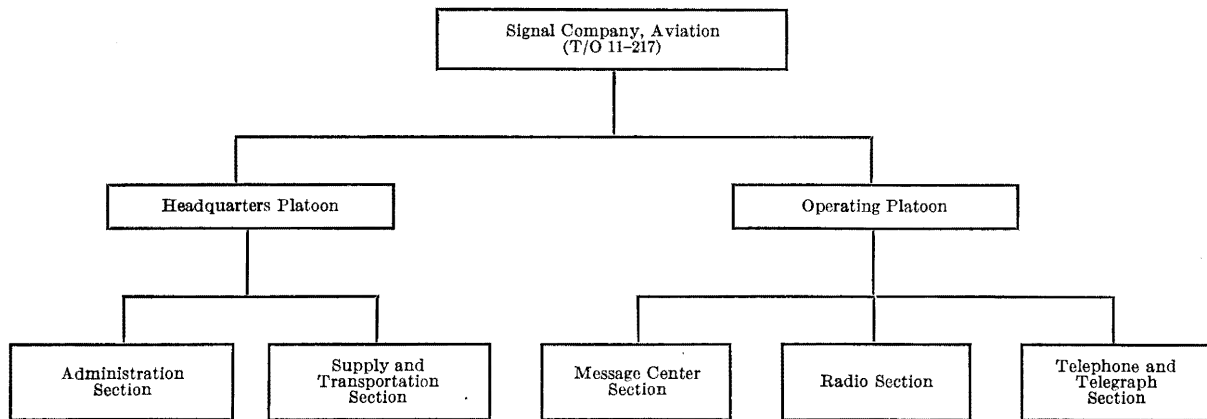


FIGURE 32.—Organization of signal company, aviation.

tral, and makes other terminal connections and installations for the superimposition of telegraph channels on such trunks. It installs, operates, and maintains the telegraph printers, perforators, reperforators, and other associated apparatus for telegraphic communication by the headquarters.

c. The signal company, air wing, has an organization similar to that of the signal company, aviation. However, since administrative radio stations are not required, a radio section is not provided in the operation platoon of the signal company, air wing.

■ 142. SIGNAL MAINTENANCE COMPANY, AVIATION.—The signal maintenance company is usually assigned one or more trunk circuits pertaining to the GHQ aviation wire system, for the maintenance of which it is responsible. The company may be located at one point as a whole, or detachments may be located at several points to facilitate the maintenance of such circuits. From time to time the company may be called upon to construct wire lines although its primary duty is one of maintenance. The company is divided into a headquarters platoon and two maintenance platoons. (See fig. 33.)

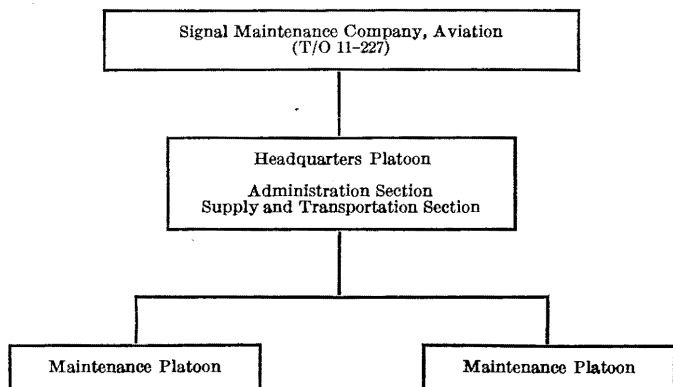


FIGURE 33.—Organization of signal maintenance company, aviation.

a. Headquarters platoon.—The headquarters platoon consists of an administration section and a supply and transportation section. It includes the company commander, the supply and transportation section commander, a wire chief, first sergeant, supply sergeant, truckmaster, mess sergeant, clerks, automobile mechanics and electricians, cable splicer, chauffeurs, cooks, general mechanic, and basic privates. It performs the company administration, supply, messing, unit maintenance of the vehicles of the company, and operation of the vehicles allotted to the platoon. Pursuant to instructions from higher authority, the company commander assigns the tasks, directs the disposition of the maintenance platoons or detachments thereof, and supervises their operations. In the latter function he receives technical assistance from the wire chief. The cable splicer is attached to either maintenance platoon, or is dispatched independently for such cable splicing operations as are required.

b. Maintenance platoons.—Each maintenance platoon includes a platoon commander, a line foreman, assistant line foremen, linemen, and a chauffeur. It is allotted several vehicles which include cargo, pick-up, telephone construction trucks, and trailers. It is organized and equipped for a limited amount of wire line construction in addition to its primary task of wire maintenance.

■ 143. SIGNAL PLATOON, AIR BASE.—The signal platoon, air base, includes a base platoon commander, chief radio operator, chief telegraph printer operator, warehouseman, chief telephone switchboard operator, linemen, message center clerks, receiving and shipping clerks, messengers, radio electricians, radio operators, telegraph printer operators, telephone switchboard operators, and basic privates. It is provided with its own transportation. It is organized and equipped for the installation, operation, and maintenance of signal communication agencies at a temporary air base, or for augmenting provisions for those functions at an established base. Each platoon is normally assigned to a permanently established air base, but may be moved as a unit at any time to a new air base or vacated from its permanent station at the direction of the GHQ aviation commander to conform to the redistribution of the GHQ aviation.

■ 144. OPERATIONS.—*a. General considerations.*—The employment of the GHQ aviation involves the establishment of GHQ aviation headquarters, district, wing, group, and squadron headquarters, airdromes, landing fields, bases, agencies, etc., in an area whose size and location are determined by many factors such as the size and composition of the GHQ aviation and the radius of action of its aircraft. To insure maximum effectiveness of the GHQ aviation these establishments in any particular area must be interconnected by a well-integrated, efficient system of rapid signal communication.

b. Communication agencies.—Within the limits prescribed in paragraph 136, elements of the GHQ aviation signal service provide message centers, local messenger service, radio and wire communication at the headquarters, air bases, and other establishments to which assigned. Message center operation is normal and consists mainly of the receipt and dispatch of outgoing messages, and the delivery of incoming messages for which the messenger service may be employed. Local messenger service is routine. Special or scheduled messengers may be employed for the dispatch of messages from one message center to another when time is not an important factor; when considerations of time are important, airplane message service may be employed. Radio communication as employed by the signal service is supplementary to wire communication and is used only where wire communication is not available, is inoperative, or where the amount of traffic is too great to be handled entirely over available wire facilities. It is employed in the initial establishment of new headquarters, air bases, and other agencies of the GHQ aviation pending the installation of a wire system. Wire communication, however, is employed for handling the great bulk of the point-to-point communication requirements of the GHQ aviation and is dealt with in the following paragraphs.

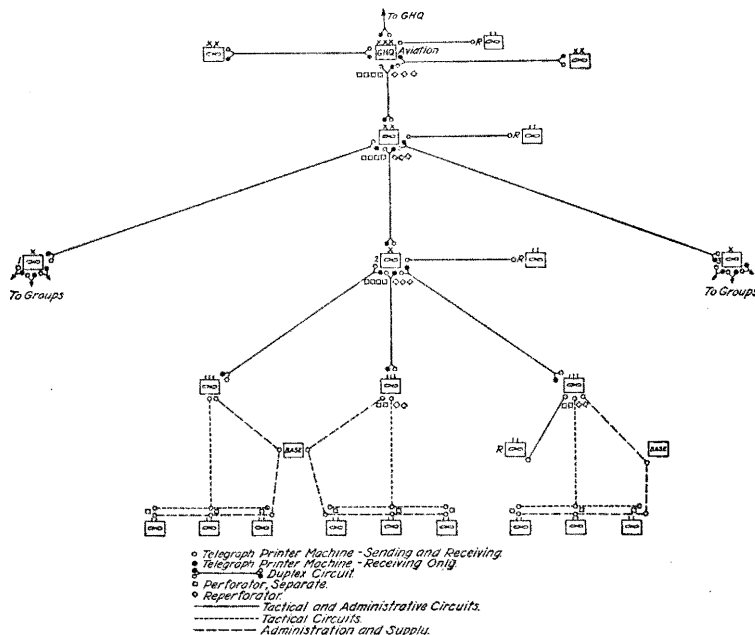
■ 145. WIRE COMMUNICATION.—*a. Wire system.*—The GHQ aviation wire system is rarely an independent system. In general, it forms part of the wire system of a higher headquarters, such as GHQ, army, or other headquarters, to which aviation may be attached or of the area from which aviation

is operating. In planning for the wire system full use is made of the wire system of these headquarters to minimize the amount of construction required.

b. Telephone communication.—The signal service establishes, operates, and maintains local telephone systems at, and maintains trunks between headquarters, GHQ aviation, and division, wing, and base headquarters. It arranges for at least one trunk circuit to each headquarters of all tactical units below the wing which are not located at the same field or similar area; and between airdromes, landing fields, and other agencies of the GHQ aviation. Telephone communication is ordinarily supplementary to that of the telegraph printer for communication over trunk circuits.

c. Telegraph printer system.—The telegraph printer is the primary means of communication between ground establishments of the GHQ aviation. In order that it may be employed to its maximum capacity, in addition to manual operation, provision is made for tape transmission, perforators and reperforators being used in conjunction therewith. Furthermore, the signal service makes the necessary installations for duplex operation on circuits where a large amount of traffic is expected. Figure 34 shows a schematic establishment of a telegraph printer system for the GHQ aviation.

■ 146. MOVEMENT OF GHQ AVIATION.—Prior to the movement of the GHQ aviation ground establishments, timely warning must be given to the signal officers concerned in order that advance planning and necessary arrangements can be made for the establishment of the required wire circuits. As aviation units and agencies usually will be located in rear areas, close cooperation and exchange of information between the GHQ aviation signal officer and the GHQ, army, or other signal officer concerned must exist in order that knowledge of existing wire systems and their utilization by the former can be obtained as a basis for planning. Signal officers usually consult with signal officers of superior units for information, make their plans for signal communication, and keep signal officers of superior units advised of their plans. The GHQ aviation signal officer in turn consolidates these plans with his. He requests that the necessary trunk circuits be provided by the GHQ, army, or pertinent signal



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FIGURE 34.—Schematic telegraph printer system for GHQ aviation.

officer. The latter makes the necessary provisions either by leasing or constructing new lines, directing the aviation signal officer to construct part or all of the required lines and lending him assistance therefor, or by making circuits available from his existing signal system. As an initial part of a move, advance parties from signal companies, aviation, including message center, messenger, radio, and wire personnel are dispatched to designated new locations. The message center and the radio stations are established and begin functioning immediately upon arrival, while wire personnel begin the construction and installation of the local telephone system and

telegraph printer stations. Signal maintenance companies, aviation, are dispatched to various locations to interconnect local wire systems with the wire system of the superior unit, or to begin the construction of such trunk circuits as directed. Radio communication is superseded by wire communication as soon as the latter becomes available. Activities of the signal platoons, aviation base, commence at the new locations upon arrival of the necessary personnel, supplies, and equipment thereat. In all moves personnel, equipment, and supplies of the signal service usually will be transported by rail, water, or its organic vehicular transportation; however, transport by aircraft may be employed if necessary.

SECTION VI

AIRCRAFT WARNING SERVICE

■ 147. **GENERAL.**—*a.* The aircraft warning service is an essential element of air defense and comes under the command of the air defense commander. For information concerning the Signal Corps units operating in an air defense command see FM 11-25.

b. The duties of the aircraft warning service include—

(1) The establishment of observation posts (or stations) throughout the area to be defended in order to detect the presence of hostile aircraft and track their movements to and within the area.

(2) The establishment of an efficient signal system over which information concerning hostile aircraft and instructions relating to defensive measures, both for troops and the civilian population, can be rapidly transmitted.

(3) The establishment and operation of one or more information centers.

c. The size of the area to be defended, the number of critical areas contained therein, and the method of defense to be employed are factors which will influence the number of units of the various arms comprising an air defense system. As pertains to the aircraft warning service, there will be a requirement for one or more units to install and operate observation posts (or stations) and information centers. In addition, one or more units are required to provide the

necessary channels of signal communication between the observation posts and the information center, from the information center to air defense headquarters, and from air defense headquarters to the various agencies to be informed and instructed when hostile aircraft approaches the defended area.

d. (1) The commander of the field forces having designated the areas to be defended, the critical areas contained therein, and the units available for defense, the air defense commander takes the necessary steps for the employment of these units. As pertains to the aircraft warning service, he receives the recommendations of the air defense signal officer, which includes the locations of observation posts, the information centers, and his headquarters, and the plan of signal communication. He approves or modifies the recommendations as he deems necessary.

(2) In preparing the plan of signal communication, the air defense signal officer coordinates his plan with that of the GHQ signal officer or the signal officer of the area to be defended. He maintains close contact with the latter officer in order that he keep thoroughly informed of existing or contemplated signal systems in the area concerned. He requests the use of circuits already established and utilizes those authorized to minimize the amount of new construction required. He requests and obtains assistance from time to time from the latter officer as the need arises.

SECTION VII

SIGNAL COMMUNICATION IN THEATER OF OPERATIONS

■ 148. GENERAL.—The commander of the theater of operations is responsible for all signal communication within the theater. In providing this communication he is assisted by the theater signal service which is organized for and charged with the installation, operation, and maintenance of signal communication for and between all echelons of THQ, down to but not including army or army group headquarters, headquarters of attached or cooperating aviation, air defense headquarters of the theater, the theater reserve, and head-

quarters of other units as may be required. Included in this responsibility of the commander is the provision of a signal system for administrative establishments in the communications zone. Where the communications zone is relatively small in area, the signal system for administrative establishments therein may be provided directly by the theater signal service to which may be allotted, by the commander, additional Signal Corps construction and operation units for the purpose. If the communications zone is extensive, requiring that a commander be placed over it for adequate control, a signal officer together with several Signal Corps construction and operation units are usually assigned to the communications zone commander and provide the signal system for his use. In some situations no communications zone may exist. The signal officer of a communications zone carefully coordinates his signal plans with those of the theater signal officer to avoid a paralleling of signal systems and a consequent duplication of effort.

■ 149. LOCATION OF THQ COMMAND POST.—*a. General.*—Considerations for the location of the THQ command post are the same as those for an army command post except that various echelons and elements of the former will be larger and more widely separated. (See par. 96.) In addition, the movement of the THQ command post may be very infrequent if at all.

b. Army.—The commander of the theater of operations may prescribe the command posts for the armies, or army groups under his command, or he may permit commanders of the latter to prescribe their own command post locations, subject to his approval.

■ 150. SIGNAL AGENCIES.—Considerations concerning the employment of signal agencies in the theater of operations are generally the same as those in the army. (See par. 97.) Only important differences in the employment of particular agencies are covered in succeeding paragraphs.

a. Pigeon communication.—The use of pigeon communication by THQ and in the zone of the interior is not contemplated nor provided for.

b. Radio communication.—While little difference exists in the employment of radio communication (par. 101), its use in the theater of operations will be greatly reduced except in such units for which it is the principal means, and for such special service radio stations as may be established. When the theater of operations is established overseas, and to which neither adequate cable facilities exist nor can be constructed in the time required, radio communication may be used between THQ and the zone of the interior. When this situation exists, speech scrambling, automatic coding, and other devices are used in addition to other signal security measures, to minimize the probability of the enemy obtaining information through the interception of such radio communication.

c. Wire communication.—Wire communication is the primary signal means in the theater of operations as it is in the army. However, it is in the organization for wire service in the theater that the greatest difference appears, which is discussed in the succeeding paragraphs.

■ 151. ORGANIZATION FOR WIRE COMMUNICATION.—The large area included in any theater of operations, the number of units and establishments contained therein, and the varying signal demands of each require the establishment of a wire system which closely approximates that furnished small urban communities of the United States by commercial telephone and telegraph companies. Experience indicates that the establishment, operation, and maintenance of the wire system in a manner similar to that employed by commercial companies, and based on standard engineering practices, will be most successful. Commercial companies approach this problem by dividing it into its two major considerations, that of plant and of traffic; which method is followed in the theater of operations.

a. Plant as defined includes both the outside and the inside plant.

(1) The outside plant consists of permanent construction including open wire and cable lines. These lines are constructed according to standard specifications and, as many of them are long lines, they include all the engineering refine-

ments of a modern telephone system. These lines including both telephone and telegraph circuits are constructed by line construction units of signal corps troops whose personnel is generally recruited from personnel of our larger commercial telephone and telegraph companies.

(2) The inside plant consists of telephone and telegraph central equipment established at the various headquarters and establishments, including common battery switchboards and telegraph switchboards with all their accessory equipment such as test frames, protective equipment, and testing equipment. Automatic telephone centrals may be established where necessary or desirable. These centrals are established and maintained by personnel of the inside plant who belong to signal corps operation units.

b. Traffic as defined includes the operation, supervision, and allocation of facilities to meet changing conditions and demands for service.

(1) The telephone and telegraph system of the theater of operations is operated by personnel of signal corps operation units. As in construction, this personnel is recruited from the personnel of our larger commercial telephone and telegraph companies. Personnel charged with supervision and allocation of facilities also belong to these operation units. At the larger headquarters, and where desirable, specially selected female telephone operators may be employed. Where joint operations are being conducted with allied armies of other nations, or where the theater overlaps occupied territory of a foreign nation and it is desired to furnish telephone service to essential industries and establishments in the occupied territory, the telephone operators at centrals which are points of contacts between our forces and allied forces, or between our forces and essential industries and establishments in foreign occupied territory, should be able to speak the language of both nations.

(2) Supervision includes those steps necessary to insure prompt and efficient service by the proper handling of calls, preventing abusive uses of the telephone or telegraph system, and cooperation with the plant personnel in keeping the system in the best possible operative condition. Trouble is reported to inside plant personnel who promptly clear the

trouble if in the inside plant, or make such tests as are necessary to locate the trouble, and call on outside plant personnel to clear if in the outside plant.

(3) Allocation of facilities includes the changing of circuits or routing of traffic to meet the demands for service in accordance with the importance of the traffic and the facilities available. It involves a thorough knowledge of the system as established and continuous study of possible future demands due to increased or changing developments and activities in the theater, and timely requests for new construction to meet these demands.

■ 152. PLANNING FOR WIRE COMMUNICATION.—In planning for the wire system many factors enter which require consideration, such as existing wire systems, territorial organization of the theater, available construction and operating personnel, supply conditions, the plan of campaign, etc. No fixed, predetermined plan can be made which applies equally to all theaters of operations under all circumstances. A careful study must be made in each case by the theater signal officer prior to and during the occupation of a theater of operations, as a result of which he arrives at a decision concerning the requirements of an adequate wire system. Wire projects are prepared showing modifications of the existing system, new construction, bills of material, and equipment. Priorities are recommended for these projects, based upon the importance of various headquarters to be served, and the urgency for signal facilities required by each.

INDEX

	Paragraphs	Page
Accuracy of direction finding under field conditions, factors affecting same.....	74	53
Administrative and personnel section:		
Army signal service.....	43	32
Headquarters signal service, GHQ.....	115	86
Administrative and supply section, signal laboratory, photographic, GHQ.....	132	93
Administrative section, depot signal company.....	91	66
Agencies, signal, army.....	97	73
Message centers.....	98	73
Messenger communication.....	99	74
Pigeon communication.....	100	74
Radio communication.....	101	74
Sound communication.....	103	76
Visual communication.....	102	76
Wire communication.....	104	76
Agencies, signal, corps.....	21	19
Intelligence service.....	24	20
Message centers.....	25	20
Messenger communication.....	26	20
Photographic.....	23	20
Pigeon communication.....	27	21
Radio communication.....	28	21
Sound communication.....	30	23
Supply.....	22	20
Visual communication.....	29	23
Wire communication.....	81-32	23
Agencies, signal, theater of operations.....	150	110
Pigeon.....	150	110
Radio.....	150	110
Wire.....	150	110
Air base, signal platoon.....	143	104
Aircraft warning service.....	147	109
Army signal service, headquarters.....	39-47	30
Assignment units:		
Corps and division, signal company, photographic.....	55	39
General, signal company, photographic.....	56	39
Calibration correction charts.....	76	55
Procedure for preparing.....	77	56
Carrier requirements:		
Army.....	108	80
Corps.....	35	27
Centrals, telephone, corps.....	33	24
Command:		
Construction battalion.....	121	87
Depot signal company.....	87	65
Of attached units, general.....	5	2
Pigeon company.....	57	39
Radio intelligence company.....	64	43
Signal battalion.....	10	4
Signal company, photographic.....	48	35
Signal laboratory, photographic, GHQ.....	128	91
Signal service, GHQ aviation.....	135	98

INDEX

	Paragraphs	Page
Command posts, location of:		
Army	96	72
Corps	20	17
Division	20	17
Radio intelligence company	83	62
THQ	149	110
Communication section:		
Army signal service	46	33
Headquarters, signal service, GHQ	118	86
Construction company:		
Construction battalion	126	91
Separate	127	91
Signal battalion	15	8
Control, radio intelligence company	82	60
Corps platoon, pigeon company	62	42
Direction finding stations, radio intelligence company	84	62
Direction finding theory	73	50
Accuracy of, under field conditions	74	53
Disposition, radio intelligence company	81	60
Duties:		
Construction battalion	122	88
Depot signal company	88	65
Pigeon company	58	40
Radio intelligence company	65	43
Signal battalion	11	4
Signal company, photographic	49	35
Signal laboratory, photographic, GHQ	129	91
Signal service, GHQ aviation	136	99
Effects of tactical operations, radio intelligence company	80	58
Employment:		
Army signal service	38	29
Corps	7	3
Signal service, GHQ	110	81
Signal service, theater of operations	110	81
Equipment and supplies, general	3	1
Equipment, supplies, and transportation:		
Construction battalion	123	88
Depot signal company	89	66
Pigeon company	59	40
Radio intelligence company	66	45
Signal battalion	12	4
Signal company, photographic	50	36
Signal laboratory, photographic, GHQ	130	92
Signal service, GHQ aviation	137	99
Formations, drills and ceremonies, general	4	2
General assignment unit, signal company, photographic	56	39
Headquarters and headquarters company:		
Construction battalion	125	90
Signal battalion	14	5
Headquarters and supply section, signal company, photographic	52	36
Headquarters platoon:		
Pigeon company	61	42
Radio intelligence company	69	46

INDEX

	Paragraphs	Page
Headquarters section:		
Headquarters, army signal service.....	42	30
Headquarters, signal service, GHQ.....	114	86
Headquarters, signal service, GHQ.....	111	84
Identification units, signal company, photographic.....	54	38
Intelligence company, radio.....	64-86	43
Initial operations.....	85	63
Laboratory unit, signal company, photographic.....	53	38
Location of command posts. <i>See</i> command posts.		
Message centers:		
Army.....	98	73
Corps.....	25	20
Messenger communication:		
Army.....	99	74
Corps.....	26	20
Motion picture department; signal laboratory, photographic, GHQ.....	134	95
Movement of GHQ aviation.....	146	106
Operation company, signal battalion.....	16	10
Operations:		
Construction company, signal battalion.....	15	8
Depot signal company.....	94	69
Headquarters and headquarters company:		
Construction battalion.....	125	90
Signal battalion.....	14	5
Operation company, signal battalion.....	16	10
Pigeon company.....	63	43
Signal section, corps.....	9	4
Signal service, GHQ aviation.....	144	105
Technique of, radio intelligence company.....	86	
Organization:		
Army.....	37	29
Army signal service.....	38, 41	29, 41
Communication section, army signal service.....	46	33
Construction battalion.....	124	88
Construction company, signal battalion.....	15	8
Corps.....	6	3
Depot signal company.....	90	66
Field forces.....	110	81
For wire communication, theater of operations.....	151	111
GHQ.....	109	81
GHQ aviation.....	138	100
GHQ signal service.....	110	81
Headquarters and headquarters company:		
Construction battalion.....	125	90
Signal battalion.....	14	5
Headquarters, GHQ signal service.....	113	84
Of manual.....	2	1
Operation company, signal battalion.....	16	10
Photographic laboratory, GHQ.....	131	93
Pigeon company.....	60	40
Radio intelligence company.....	67	45
Signal battalion.....	13	5
Signal company, photographic.....	51	36
Signal intelligence service, headquarters, army signal service.....	47	34
Signal section, corps.....	8	3